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EDITORIAL

We shall have to identify the opportunities to available to our Laboure force both in farm and firm to provide them employment and employability. Besides natural resources, we have provisional gray areas, where we can engage them fruitfully. Odisha is an agricultural dominated state. Mostly it is producing rice and vegetables as Odisha consume rice and vegetables in a higher quantity compared to other states. As regards economic crop, Odisha was producing jute and sugar cane up to third quarter of twenty century. There were seven sugar mills and two jute mils. Due to fall in demand of jute products it was dropped thirty years before the end twenty century and sugar mills towards last decades of twenty century except one or two (which are not in good health). Others are closed due to monopolistic approach of private mill owners. However, cotton production has been emerged and increasing day by day. Cotton of Odisha is high spread and high yield in the rainfed areas of western and southern districts of (i) Kalahandi (ii) Balangri (iii) Raygada (iv) Nuapada (v) Subarnpur (vi) Gajapti and (vii) Koraput. The govt. of Odisha should take initiative to re-open the shut down spinning mills for the migrant laborers working in Gujurat. At the same time incentives should be given to the cotton procurement of their produces in agricultural sector. Generally, interest free loan and procurement of their products can be considered in a place giving one-rupee rice or five rupees lunch to young and working class (18 years to 58 years young men and women). Cotton in now produced in rainfed none-rice producing agricultural land of western and southern Odisha. It can extend to North and Central Odisha.

Industrialist of Gujurat who are running textile mills be initiated to Odisha as a getaway to eastern India by providing subsidized land from land bank, electricity generated by captive power plant and finance from banks operating in Odisha. Skilled textile laborers working in Surat can be reemployed by this money circulation in Odisha's trade and commerce will be accelerated. Odisha is famous for traditional handloom products viz, Sambalpuri Nuaptna, Maniabandi, Barampuri dresses are noteworthy. Fashion technology may be regulated to design dresses out of the above handloom to popularize such govt. nationally and internally. This is only one gray besides many available in Odisha like Bamb products, chemicals and pharmaceuticals industry and fishery (both marine and sweet water).

The Corona Virus (Covid-19) pandemic has become a global challenge for all over the world. In particular, this outbreak has become a greater challenge for the economically weaker state in India. This virus is not only created the health hazards and economic regression but also affect the livelihoods of the different sections of the society due to declaration of nationwide lock down and shut down by the government. In particular, migrant labourers are worst sufferer during this pandemic. It is worthy to give attention that migrant labourers contribute to nearly eighty percent of the total workforce (Chatterjee,

2020). But it is regret to say that government has no clear cut database for inter and intra state migrant labourers. Government of Odisha has taken several steps for the migrant labourers such as bringing back from other state to home, providing quarantine facility, providing free health facility to the corona migrant labourers, providing free ration etc. during this pandemic. Respite of these free facility to the migrant labourers by the government of Odisha, they have worst sufferer in this pandemic. Nonetheless to say, these facilities were like a “**drop in the ocean**”. And, their plight is beyond imagination. Migration is an integral part of the process since evolution and closely associated with human civilisation. It is a high time by the government of Odisha to think and make an insurgent revolutionary policy for them.

Textile Industry was one of the premier industries of medieval Orissa as is known from the accounts of foreign travellers and Persian writers. Abul Fazl mentioned about manufacturer of cloth in Orissa. Ralph Fitch though actually did not visit Orissa mentioned about the production of “**very much cotton cloth**” in Orissa in the eighties of sixteenth century. In the state of Odisha, under globalized forces, Odisha’s spinning mills could not compete with the mechanized superior quality of products. As a result the more than eleven spinning mills are shut down/ inactive since long time. Odisha has not produced any textile product during the last five years as all the 13 textile industries, including the Orissa Textiles Mills (OTM), have remained inoperative for long. Reverse migration labourers could have been accommodated in spinning industries to the greater extent if the government of Odisha take the expeditiously steps for reactivating of these spinning industries in Odisha. Most of the migrant labourers are skilled and capable in their profession. They are reluctant to return to their work place again. SPINFED was established way back in the year 1984 with an objective to monitor the physical and financial activities of member spinning mills and power loom industries in the State. It is a proper time for the Odisha government to identify the skilled labourers and rehabilitate them in these spinning industries and that would be helpful for boosting of state economy as a whole. Further Government should monitor and refunctioning of SPINFED and make a viable attracting investment environment in textile sectors in Odisha to rejuvenate of these industries. This would create ample of employment opportunities for reverse migration labourers in Odisha.

Prof. Malay Kumar Mohanty
(Managing Editor)

Dynamic Relationship Among the Sensex, Gold Prices and Foreign Exchange Rate: A Study

Dr. Ashoke Mondal

ABSTRACT

The study focuses on the dynamic interactions among Sensex, Gold prices and Foreign exchange rate. For that purpose, monthly data of all select variables from April, 1980 to March, 2019 are collected and analysed. At the first stage of analysis, it is found that select variables contain unit roots at level but stationary after taking first difference. Johansen's co-integration test is applied for checking the long term relationship among the variables. After confirming long run association among the select variables, causality among the select variables is examined with the help of VECM model and Granger causality test. The empirical results confirm that the select variables are interrelated in long run. In case of short run relationship, causality is running from Sensex to foreign exchange rate only. The findings of the study did not confirm any other relationship in short run.

Keywords: *Causality, Sensex, Gold prices, Foreign Exchange Rates, Johansen's Co-integration, VECM, Granger causality*

Introduction

One of the important areas of financial research is studying the assets price movements. This is mainly due to the facts that there is no consensus among researchers regarding short run and long run behaviour of the assets prices. Another reason is the development of advanced sophisticated tools that are capable for studying the assets price movements. Both the stock market and commodity market play a vital role in the development an economy. It is widely known that the development of stock market is a positive sign for any economy. Furthermore, sensex, regarded as an extremely indicator of stock market, is strongly influenced by different macroeconomic factors such as changes in GDP, exchange rate, interest rate, inflation, oil prices In India, gold is considered as an attractive alternative investment instead of stocks and is treated as a conservative investment in liquid asset. Owing to the fact that with the passage of time the demand for gold consistently increases, in the volatile market, investors withdraw money from the stock market and invest funds in the bond market and gold market. This implies the interrelationship between gold price and sensex. High demand in gold market is contributing towards appreciation of dollar value and depreciation of the rupee value. Hence, gold

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price and foreign exchange rate are also interrelated. Similarly, keeping in mind that the stock market is heavily dependent on alteration in exchange rate, one may safely conclude that sensex, gold price, and exchange rate are interlinked and interdependent. Liberalisation has resulted in the integration of Indian economy with world economy, which further encouraged the foreign portfolio investors to invest huge amounts of money in the Indian stock market. Under the prevailing uncertainties in the market, the increment in the liberalisation induced stock market volatility, has also affected the interrelated markets. Present and potential investors, traders and policy makers are interested to know the relationship among them. In this context, an attempt has been taken to study the dynamic interaction among sensex, gold prices and foreign exchange rate.

Literature Review

Association between gold and oil prices was studied by Šimáková (2011) using correlation, Johansen's cointegration test and Error Correction Model (ECM). The findings of his study revealed that the select variables are interrelated in long run. Patel (2013) established the relationship between stock prices and gold prices with the help of cointegration analysis. With the help of Granger-causality, he has shown that causality runs from gold price to Nifty. Therefore, he concluded that gold price contains significant information to forecast NIFTY returns. The findings of the study also support the findings of Khan and Sarkar's (2014) study. In their study, Khan and Sarkar concluded that unidirectional causality runs from gold price to stock prices. Bhunia (2013) studied the co-integrating relationship among crude oil prices, gold prices, exchange rate and stock prices by taking data over a period of 1991 to 2012. ADF test and Johansen co-integration test were applied by him to test the stationarity of data and co-integrating relationship among the variables. The findings of the study revealed that co-integration relationship exist among the variables but no causality among variables was found in his study. Seshaiyah, S Venkata et al. (2017) examined the influence of oil prices, exchange rates, trade deficit and fiscal deficit on the prices of gold and found co-integrating relationship among selected variables. With the variance decomposition analysis, they have shown that 93.4 % variation in gold prices is explained by variation in gold prices itself and 11.31 % variation in trade deficit is explained by the variation in gold prices. Mohanamani et al. (2018) studied dynamic linkage among Gold prices, Oil prices, Exchange Rate and Stock Market returns. After confirming the co-integrating relationship using Johansen's test, they applied vector error correction model. The results showed that fluctuation in oil prices lead to fluctuation in exchange rate which in turn leads to fluctuation in gold and stock prices. From the Granger-causality test, it revealed that changes in BSE Sensex influence exchange rate and gold price and exchange rate is influenced by gold and oil prices. Co-integration and Equilibrium Relationship among the selected sectoral Indices was studied by Kurisetti et al. (2018). They have used ADF test for checking the stationarity of the data. Engle and Granger's cointegration test technique was used for testing the cointegrating relationship among variables. They have estimated VECM model for finding out the relationship among the different sectoral indices. The findings of the study confirmed that the sectoral indices are interrelated in short and long run. In their paper, Sathyanarayana et al. (2018) showed that crude oil prices is an important determinants of share prices and has shown that the fluctuation in crude oil prices has an impact on the volatility of the stock returns with the help of GARCH (1,1) model. In their study, Armeanu et al. (2019) studied the association between the energy market and stock returns. To study the short term and long term relationship, cointegration technique has been applied in their study. They found co integrating relationship between different indicators of

energy market and Romanian capital market. Granger causality test also confirmed the bi-directional causal relationship between energy market and capital market. They also observed that the contribution of different indicators of energy market in explaining the stock market's forecast error variance has been increased during the study period. Lastly, they also applied Auto-Regressive Distributed Lag (ARDL) technique by taking mixture of $I(0)$ and $I(1)$ to estimate the dynamics of the selected variables. They concluded that causality exist between energy market and capital market.

Research Gap and Objective

From the literature, it has been observed that there is no consensus among the researchers regarding relationship among the sensdex, gold prices and exchange rate. But a large number of researchers supported the view that there is long term inverse relationship between gold prices and sensdex, however, in case of exchange rate and sensdex, diverse opinions arise. According to 'portfolio balancing approach' increase in stock market would attract the foreign investors. This will increase demand for local currency and its consequence, there will be appreciation of rupee value. Thus one gets the impression that positive movements in stock market lead to appreciation of rupee. On the other hand, according to 'goods market approach', a depreciation in local currency facilitates the export of goods, which further results in the increment foreign demand and revenue of the firms. Going by this logic, depreciation in local currency has positive impacts on share prices of firms as well as sensdex. Hence, there is a disagreement regarding the relationship between exchange rate and stock market movement among the various researchers. All these researchers had tried to establish the relationship. However, from the findings of their study, no definite conclusions can be drawn. From that perspective, in the present study an attempt has been taken to verify whether sensdex (as an indicator of stock market) is interrelated with the prices of gold and exchange rate, in case they are interrelated, then one may try to identify the nature of that relationship and further examine whether the relationship is short term or long term

Significance of the Study

Nowadays, topic highlighted in the study is gaining importance the study is significant relevance from the perspective of researchers, analysts, investors, policy makers, portfolio managers. For forming portfolio, investors are also interested to know the relationship among financial assets and how the return of one asset may affect the return of another asset. Policymakers may assess the impacts of changes of any policy variables on stock market. For those reasons, policy makers, investors and portfolio managers should take into considerations the relationship among these variables at the time of their decision making. It is also relevant for the cross border movement of funds. Nowadays, the relationship among different markets is a matter of serious concerns for all the parties because the volatility of one market would have an impact on the other markets. Thus this field deserves in depth study. Finally the importance of the study is attributed to the facts that it is related with investment decisions, selection of portfolios, developing strategies for risk management and taking policy decisions.

Methodology

Data and period of study : The main objective of the study is to study the dynamic interaction among the gold price, sensdex and foreign exchange rate for the period April,1990 to March,2019. Data used in this study are secondary in nature. Monthly data relating to spot gold prices have been collected from World Gold Council. Monthly BSE SENSEX price and monthly Foriegn exchange rate

data have been collected from bseindia.com and <https://fred.stlouisfed.org/> and E-views 5.0 software has been used to analyse the data.

Techniques used in the Study

In this paper dynamic relationship among the gold market, Sensex and exchange rate are studied over a period of April,1990 to March,2019. For this purpose several econometrics techniques have been used. Before applying any techniques, the Sensex, gold price and exchange rate series are modified by taking logarithmic transformation. To get an idea about the series, they are plotted over the time period. For developing the relationship among the select variable, the pre-requisite condition is that series should be stationary. So at the first step of analysis, unit root test is applied for checking the stationary of the data series. Here null hypothesis is that select variables series contain unit root (non stationary). In this study, Augmented Dickey Fuller Test is used for testing the unit root of the select variable. There are three different models for testing the unit root of selected series

Model 1: With intercept and without trend

$$\Delta y_t = \alpha + \rho y_t + \sum_{j=1}^k \gamma_j \Delta y_{t-j} + \varepsilon_t$$

Model 2: With intercept and trend

$$\Delta y_t = \alpha + \beta t + \rho y_t + \sum_{j=1}^k \gamma_j \Delta y_{t-j} + \varepsilon_t$$

Model 3: Without intercept and trend

$$\Delta y_t = \rho y_t + \sum_{j=1}^k \gamma_j \Delta y_{t-j} + \varepsilon_t$$

For testing the co-integration among the select variables, Johansen Co-integration test has been used in this study. In case of Vector Auto Regressive (VAR) of order p

$$y_t = A_1 y_{t-1} + \dots + A_p y_{t-p} + B x_t + \varepsilon_t$$

The above equation can be rewritten as

$$\Delta y_t = \Pi y_t + \sum_{i=1}^{p-1} \Gamma_i \Delta y_{t-i} + B x_t + \varepsilon_t$$

$$\text{where } \Pi = \sum_{i=1}^p A_i - I$$

$$\text{and } \Gamma_i = -\sum_{j=i+1}^p A_j, \text{ where } i = 1, 2, \dots, p-1$$

Where y_t = vector of endogenous variable (p*1)

Γ_i = Metrics of short term parameters

Π = Matrix of long term parameters

x_t = Vector of deterministic terms

ε_t = vector of error terms

In the system of I (1), the rank of matrix determines the number of cointegration relationship among select variables. In this context, number of characteristic roots or eigen values, that are

significantly different from zero, is known as rank of that matrix. If the rank of cannot be full rank (the number of variables). Zero rank confirms no long term relationship among the select variables. The variables are to be co integrated if the following condition is satisfied

$$= \text{of rank } 0 < r < p$$

Where = matrix of dimension (p*r) and (r*p)

Here is a matrix that represents cointegrating vector and gives the weights of cointegrating relationship in VECM. There are two types of Johansen’s test: maximum eigen value test and trace test.

In maximum eigen value test the null hypothesis is that co-integrating rank is equal to r against the alternative hypothesis where cointegrating rank is greater than or equal to r+1 and testing is done in a sequence (under null hypothesis r=0,1,2.....p) and the following test statistics is used.

Trace test is a joint test where null hypothesis is that cointegration rank which equal to r. On the other hand , alternative hypothesis that cointegrating rank is which is more than r or k (unspecified). Here the test statistic is the following

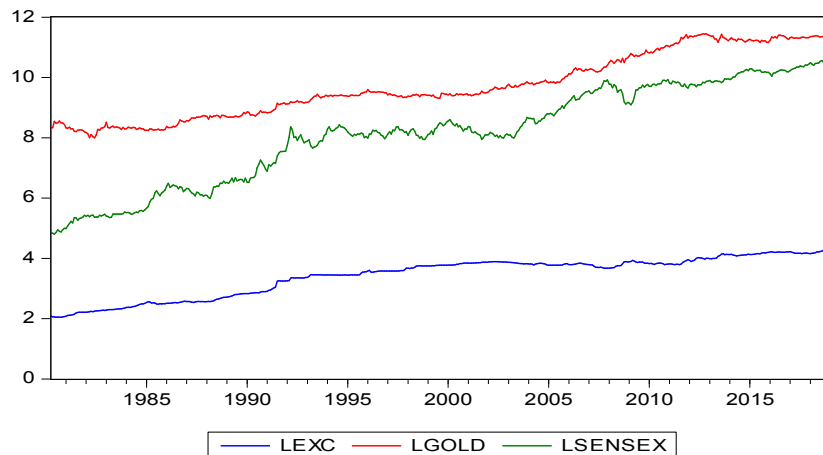
Granger Causality test : To examine whether x causes y or y causes x, the following regression equations are used and for this purpose F statistic is used.

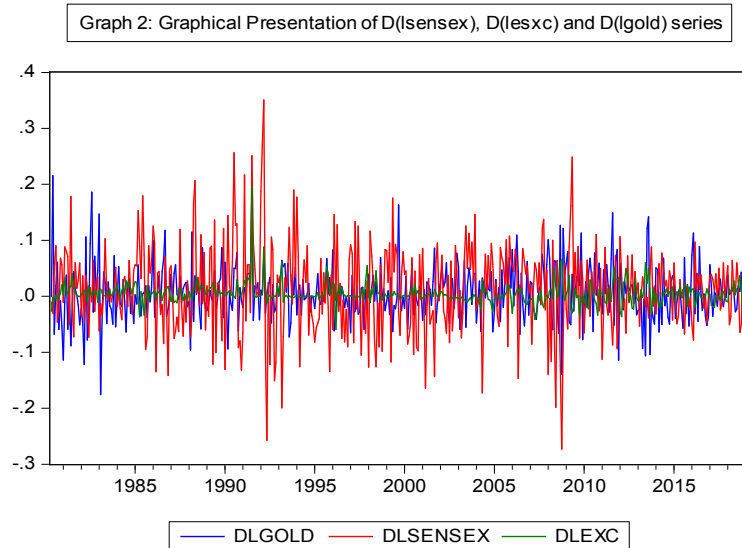
But, in case of co-integrated series, short run causality is judged through VEC Granger Causality/ Wald test. Here, null hypothesis is that there is no short term causality among the select variables. If value of chi-square is greater than the critical value, then null hypothesis is rejected.

Results and Findings:

At the initial stage, the data for the log values of Sensex, log values of gold prices and log values of exchange rates have been plotted against time. This is presented in graph 1. From the following graph, it is clear that the data series have a trend component and they are upward rising. It is also clear that the series have unit roots at level form. After taking first difference of the data series, they are plotted over time in graph 2. Graph 2 shows that the data series are stationary and there is no trend component in the data series.

Graph1: Graphical presentation of lsensex, lgold and .lexc.





ADF test results is shown in Table 1. The results show that the select variables contain unit root at level. Here null hypothesis (the series has unit root) is accepted. After taking first difference, they become stationary, because null hypothesis is rejected at 1% level. For Johansen’s cointegration test, it requires that all the variables should be stationary at same order. Since all the variables are stationary at I(1), they should be integrated of order one

Table 1: Unit Root test Results

Variables	At level(With intercept)			
	ADF statistics	Critical Value		Prob.
		1% level	5% level	
LSENSEX	-1.463225	-3.444128	2.867509	0.5516
LGOLD	0.062603	-3.444158	-2.867522	0.9626
LEXCHANGE	-2.366843	-3.444158	-2.867522	0.1518
Variables	At level(With intercept and trend)			
	ADF statistics	Critical Value		Prob.
		1% level	5% level	
LSENSEX	-2.395006	-3.977830	-3.419474	0.3816
LGOLD	-2.290150	-3.977873	-3.419494	0.4380
LEXCHANGE	-1.347757	-3.977873	-3.419494	.8745
Variables	At level (Without intercept and trend)			
	ADF statistics	Critical Value		Prob.
		1% level	5% level	
LSENSEX	3.113001	-2.569923	-1.941503	0.9996
LGOLD	3.390495	-2.569934	-1.941504	0.9998
LEXCHANGE	3.588276	-2.569934	-1.941504	0.9999

Variables	At first difference (With intercept)			
	ADF statistics	Critical Value		Prob.
		1% level	5% level	
D(LSENSEX)	-19.92673	-3.444158	-2.867522	0.0000***
D(LGOLD)	-25.06280	-3.444158	-2.867522	0.0000***
D(LEXCHANGE)	-16.29720	-3.444158	-2.867522	0.0000***
Variables	At first difference (With intercept and trend)			
	ADF statistics	Critical Value		Prob.
		1% level	5% level	
D(LSENSEX)	-19.94154	-3.977873	-3.419494	0.0000***
D(LGOLD)	-25.05118	-3.977873	-3.419494	0.0000***
D(LEXCHANGE)	-16.47253	-3.977873	-3.419494	0.0000***
Variables	At first difference (Without intercept and trend)			
	ADF statistics	Critical Value		Prob.
		1% level	5% level	
LSENSEX	-19.48145	-2.569934	-1.941504	0.0000***
LGOLD	-24.55258	-2.569934	-1.941504	0.0000***
LEXCHANGE	-15.50241	-2.569934	-1.941504	0.0000***

Source: Compiled by the author

***** significant at 1% level**

Since autoregressive model is based on determination of appropriate lag length, choosing appropriate lag length is essential before cointegration test. For that purpose multivariate information criteria such as sequential modified LR test statistics(LR), Final Prediction Error (FPE), Akaike Information Criteria(AIC), Schwarz Information Criteria(SIC) and Hannan Quinn Information Criteria (HIC) have been used. Table 2 shows the results of lag selection criteria.

Table 2: Lag selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-852.4553	NA	0.008277	3.719371	3.746313	3.729980
1	2499.472	6645.560	4.03e-09	-10.81510	-10.70732*	-10.77266
2	2526.827	53.87704*	3.72e-09*	-10.89490*	-10.70630	-10.82063*
3	2534.397	14.81114	3.75e-09	-10.88868	-10.61925	-10.78259
4	2537.041	5.137991	3.85e-09	-10.86105	-10.51079	-10.72312
5	2541.969	9.514171	3.92e-09	-10.84334	-10.41226	-10.67359
6	2547.886	11.34497	3.97e-09	-10.82994	-10.31803	-10.62836
7	2553.312	10.33360	4.04e-09	-10.81440	-10.22166	-10.58099

Since all the criteria indicate that optimum lag for Johansen’s cointegration test should be 2. In the next step, Johansen’s cointegration test is applied for testing the cointegration among the series. The results of Johansen’s cointegration test is shown in table 3.

Table 3: Results of Johansson Coinegration Test

Time Period			
No of Observations			
Unrestricted Co-integration test (Trace)			
Hypothesized No. of CE(s)	Eigenvalu e	Trace Statistic	0.05 Critical Value
None *	0.052687	32.79063	29.79707
At most 1	0.015514	7.622040	15.49471
At most 2	0.000756	0.351533	3.841466
Trace test indicates 1 cointegrating eqn(s) at the 0.05 level			
* denotes rejection of the hypothesis at the 0.05 level			
**MacKinnon-Haug-Michelis (1999) p-values			
Unrestricted Co-integration test (Maximum Eigen value)			
Hypothesized No. of CE(s)	Eigenvalu e	Max-Eigen	0.05 Critical Value
None *	0.052687	25.16859	21.13162
At most 1	0.015514	7.270507	14.26460
At most 2	0.000756	0.351533	3.841466
Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level			
* denotes rejection of the hypothesis at the 0.05 level			
**MacKinnon-Haug-Michelis (1999) p-values			

Source: Compiled by the author

As per Table 3, Trace statistic is 32.79 and Maximum eigen value test statistics (26.19) exceed the critical value at 5 % level It Therefore, alternative hypothesis may be accepted. It means at least one cointegrating relationship exists. Both the test suggests at least one cointegration relationship among variables. It means that Sensex, gold price and foreign exchange rate are interrelated in long run and changes of stock market is associated with the changes of gold market and foreign exchange market. The estimated long run cointegrating equation (normalized) is

$$LSENSEX=3.427738-0.865519 LGOLD-0.922155 LEXCHANGE$$

The above cointegrating equation reveals that Sensex and gold prices are inversely related in long run. If sensex is upward rising, then gold prices will be downward and vice-versa. The results also reveal that foreign exchange rate also inversely related to sensex in long run. After confirming the long

term relationship among the select variables, short term relationship among the variables is examined with the help of Vector Error Correction Model (VECM). This is presented in table 4.

Table 4:Results of Vector Error Correction Estimation

LSENSEX(-1)	LGOLD(-1)	LEXCHANGE(-1)	C
1.000000	-0.865519	-0.922155	3.427738
	(0.12661)	(0.20775)	
	[-6.83637]	[-4.43874]	
Error Correction:	D(LSENSEX)	D(LGOLD)	D(LEXC)
CointEq1	-0.035806	0.024774	-0.000455
	(0.01092)	(0.00667)	(0.00248)
	[-3.27829]***	[3.71582]***	[-0.18359]
D(LSENSEX(-1))	0.088634	-0.000233	-0.017472
	(0.04646)	(0.02836)	(0.01055)
	[1.90756]	[-0.00821]	[-1.65567]
D(LSENSEX(-2))	0.012427	-0.004662	0.022888
	(0.04664)	(0.02847)	(0.01059)
	[0.26647]	[-0.16377]	[2.16094]*
D(LGOLD(-1))	0.027460	-0.161335	0.001517
	(0.07467)	(0.04558)	(0.01696)
	[0.36776]	[-3.53963]***	[0.08944]
D(LGOLD(-2))	-0.017937	-0.095297	-0.027706
	(0.07450)	(0.04548)	(0.01692)
	[-0.24076]	[-2.09541]*	[-1.63740]
D(LEXC(-1))	-0.311929	0.020762	0.286665
	(0.20832)	(0.12717)	(0.04731)
	[-1.49735]	[0.16326]	[6.05893]***
D(LEXC(-2))	-0.072240	0.245829	-0.022562
	(0.20706)	(0.12639)	(0.04703)
	[-0.34889]	[1.94493]	[-0.47978]
C	0.012905	0.006681	0.003548
	(0.00384)	(0.00234)	(0.00087)
	[3.35999]***	[2.84942]***	[4.06782]***

Source: Compiled by the author

*** Statistically significant at 1% level; * Statistically significant at 5% level; [] t-values

From the table 4, it is seen that estimated coefficient of error correction term of LSENSEX is - 0.035806 and it is significant at 1% level. It is a indicator of long run relationship. In case of gold price, the value of error correction term is positive and significant. It is negative and insignificant in case of foreign exchange market. It also reveals that if SENSEX deviates temporarily from its long run equilibrium, the deviations are adjusted towards long run equilibrium. Therefore, we can conclude that long term causality is running from gold prices and foreign exchange rate to SENSEX and it is statistically significant at 1% level. It can also be concluded that 3.58% short term deviations would be adjusted every month for achieving long term equilibrium of SENSEX. Similarly long term causality is running from gold market and stock market to foreign exchange market although, it is not statistically significant. From the results of VECM, short-run relationship has been analysed. From the VECM results, it is clear that SENSEX is influenced by its previous lags only. Gold market and foreign exchange market do not influence stock market in short run. Similarly gold market is also influenced by its previous lags. So no causality is running from stock market and foreign exchange market to gold market in short run but foreign exchange market is influenced by previous lag of SENSEX. Therefore, short-run causality is running from stock market to foreign exchange rate.

Since the series are co integrated, VEC Granger causality test/ block exogeneity wald test is applied for testing the causality. The results of this test is presented in table 5.

Table 5: Results of VEC Granger Causality/Block Exogeneity Wald Tests

Sample: 1980M04 2019M03			
Included observations: 465			
Dependent variable: D(LSENSEX)			
Excluded	Chi-sq	Df	Prob.
D(LGOLD)	0.225826	2	0.8932
D(LEXC)	2.829031	2	0.2430
All	3.051718	4	0.5492
Dependent variable: D(LGOLD)			
Excluded	Chi-sq	Df	Prob.
D(LSENSEX)	0.027167	2	0.9865
D(LEXC)	4.265565	2	0.1185
All	4.328045	4	0.3634
Dependent variable: D(LEXC)			
Excluded	Chi-sq	Df	Prob.
D(LSENSEX)	6.986856	2	0.0304*
D(LGOLD)	2.800534	2	0.2465
All	10.08659	4	0.0390*

Source: Compiled by the author,

** significant at 5% level*

Table 5 reported short run causality for the variable D(LSENSEX), D(LGOLD) and D(LEXC). In case of first two variables, short-run causality is absent. In case of causality of D(LEXC), D(LSENSEX) is emerged as a significant variable. It is consistent with the results of VECM results which is depicted in Table 4.

Conclusions

In this study, the dynamic interaction among senssex, gold price and foreign exchange rate are studied by taking monthly data over a period of April,1980 to March,2019. The study provides useful information to the financial analyst, present and potential investors. In an open economy, these variables are interrelated and interdependent. To study the dynamic relationship between the select variables, co-integration analysis and causality analysis have been done. From the findings of the study, it is revealed that the select variables are co-integrated and there is long term relationship among the select variables. From the study, it also seen that selected variables are mostly dependent on its past lag values and short run causality is running from senssex to foreign market.

Implications and Limitations of the study

This study circulates around the pivotal objective of finding out the dynamic relationship among senssex, gold prices and exchange rate. From the study, it has been revealed that the select variables are inter-related in the long run and in the short run, causality exists between exchange rate and gold prices. The study will add value to the existing domain of the knowledge in this field. The findings of the study provide a comprehensive understanding of the dynamic relationship between senssex, gold price and exchange rate. Further, it has implications for domestic and foreign institutional investors also. This study may provide a supporting basement for financial analysts, portfolio managers, present and potential investors to get an idea about the interrelationship among discussed variables so as to form portfolio of different assets. Thus, it will also provide them with clear insights in developing their investment strategies.

The main limitation of the study is that the study has taken into considerations only three variables such as senssex, gold prices and exchange rate. There may be other variables such as oil prices, interest rates, inflation rates etc,which if incorporated in addition to existing variables may provide different results and inference.

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Real Exchange Rates and India's Exports to United States: An Application of ARDL Approach

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ABSTRACT

This paper examines both the long-run and short-run impact of real exchange rates and its volatility on India's exports to United States by using autoregressive distributed lag (ARDL) bound test on quarterly data spanning from 1991Q1-2018Q4. The results of sensitivity analysis conducted by using ARDL bound testing approach confirm that India's aggregate real exports are relatively more sensitive to the real exchange rates in the long-run but less responsive in the short-run. The study also reveals that economic activity has statistically significant and positively associated with the level of exports. However, the exchange rate volatility has an insignificant impact on India's exports to United States. The empirical results failed to reject the null hypothesis of no short-run causality. Therefore, it is clear that exports in India are mainly caused by other factors, not by the real exchange rate volatility. The estimated coefficient of error correction term (ECT) is negatively and statistically significant at 5 percent level of significance, which indicates that the speed of adjustment towards long-run equilibrium is 24 percent within a quarter in responses to the disequilibrium caused by the previous period's short-run shocks of explanatory variables on real exports. The study recommends that the Reserve Bank of India should consistently monitor the foreign exchange market to protect real exports from exchange rate volatility and try to moderate it whenever the exchange rate fluctuations breach a particular level.

Keywords: *Real exchange rate, Volatility, Export, Error correction term, ARDL model.*

Introduction

Due to the unequal distribution and imperfect substitutability of some of the factors, no country is in a position to produce all of its needs; consequently, international trade is indispensable for every nation of the world. The nations try to produce those goods in which they have a comparative advantage and exchange the specialised products and services among others. Today, almost all countries have opened their economies for trade and investment with the rest of the world. The global trade openness ratio rose from 38.53 percent in 1991 to 59.36 percent in 2018. India's percent share of trade to GDP

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also has improved from 16.99 in 1991 to 43.40 percent in 2018 (World Bank national accounts data). As per the Direction of Trade Statistics data, India has a very lower contribution to world trade. India's share in world merchandise exports has registered a small growth from 0.51 percent in 1991 to 1.67 percent in 2018, and its share in global imports grew from 0.54 percent in 1991 to 2.60 percent in 2018.

Trade, one of the major components of balance of payments (BoP) is influenced by exchange rate fluctuations. Exchange rate, the rate at which one country's currency can be converted into another, plays a vital role in international trade of goods and services. As regards to exchange rate determination, a number of economists have propounded several methodologies. Some of the prominent theories of exchange rate determination include Purchasing Power Parity theory (Cassel, 1918) and Productivity Differential theory (Balassa and Samuelson, 1964). After the collapse of the fixed exchange rate system in 1971, some other economists put forth their view. The main among them are Flexible Price Monetary model (Frenkel, 1976), Sticky Price Monetary approach (Dornbush, 1976), Real Interest Rate Differential model (Frankel, 1979) and Sticky Price-Assets Monetary model (Hooper and Morton, 1982). Since independence India, being a member of IMF, followed the par value system where external par value of Indian rupee was fixed with gold and UK pound sterling. India pegged its currency to the pound sterling (from December 1971 to September 1975) and to US dollar (from August 1971 to December 1991). After breakdown of Bretton-Woods system, the value of pound collapsed, and India witnessed misalignment of the rupee. To surmount the stress, India pegged its currency to the basket of 14 currencies, where exchange rate was officially determined by the RBI (Pattnaik et al., 2003).

The period after Gulf crises of 1990 and severe BoP crisis of 1991 witnessed two-step downward adjustment of 18-19 percent in the exchange rate of the Indian rupee. The government also changed its trade policy from highly restrictive form to a liberalized system. In March 1992, liberalised exchange rate management system (LERMS) was adopted whereby 40 per cent of foreign exchange earnings were to be surrendered at the official exchange rate while the remaining 60 per cent were to be converted at a market determined rate. This promoted exports and increased the foreign exchange reserves. The dual rates were converted into one from March 1993; and finally, in August 1994 by accepting Article VIII of Article of Agreement of the IMF. The government of India allowed 100 percent conversion of forex earnings on current account at market based rate (Ranadive and Burange, 2011). Now, exchange rate in India is determined by demand or supply position of foreign currencies, thus, affected by BoP situation of the country. A deficit in BoP account results into depreciation in the rate of exchange while a surplus in the BoP appreciates the exchange rate and strengthens the foreign exchange reserves.

The 1991 reform touched upon almost every aspect for the betterment of the Indian economy, particularly targeting the foreign exchange market (deregulation) and international trade (liberalization). India's overall share of total world trade increased from 0.52 percent in 1991 to 2.12 percent in 2011 and 2.13 percent in 2018 (IMF, DoTs database). However, exchange rate and international trade are interconnected but it is complicated to predict the impact of exchange rate volatility on trade flow (imports and exports). In India studies show both the presence and absence of link between exchange rates volatility and foreign trade. Dholakia and Saradhi (2000) found significant relationship between exchange rate and export quantity but exchange rate volatility has no significant impact on the exports. Srinivasan and Kalaivani (2013) found a negative and significant relationship between the exchange rate volatility and real exports both in the short-run and long-run, implying that higher exchange rate

fluctuation tends to reduce real exports in India. Bhattacharya and Mukherjee (2014) claimed that exports in India are mostly caused by other factors, not by the real exchange rate. Similarly, Haider and Adil (2017) indicated that real exchange rate has insignificant impact on exports. In general, it is prescribed that weaker domestic currency stimulates exports and makes imports more expensive; but starting from 2002 onwards, the expected relationship seems to have been reversed. Veeramani (2008) observed that high export growth occurred despite REER appreciation in India over the period from 2002 to 2007. But, it does not imply that an appreciation in REER had no adverse impact on exports. The growth rate of exports might have been higher without REER appreciation.

The remainder of the paper is structured as; section two reviews the literature on exchange rate and international trade, the third section describes the data collection and methodology, the empirical results of export model are discussed in the section fourth and section fifth concludes the observations.

Review of Literature

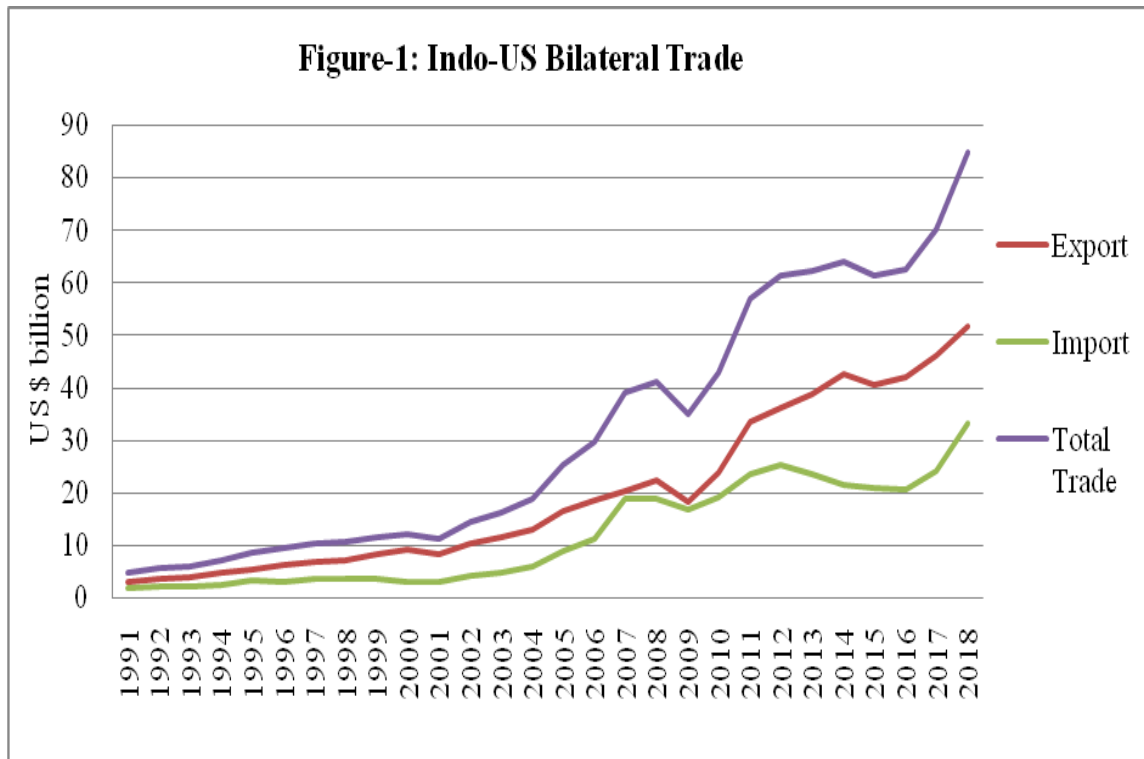
The expected impact of exchange rate volatility on international trade activities can be positive or negative depending on the assumptions made on issues like the presence or absence of forward markets and other hedging instruments, the modelling of trader's risk preferences, the structure of production such as the prevalence of small firms, and the degree of economic integration (Auboin and Ruta, 2013 and Bahmani-Oskooee and Hegerty, 2007). A number of studies, however, support the view that a rise in exchange rate volatility results into a decrease in international trade volumes. If economic agents are risk averse, increased volatility in exchange rate increases uncertainty in the market and raises the cost of conducting international trade. Ethier (1973) mentioned that when firms know that their revenues depend on the future exchange rate, the exchange rate uncertainty will not affect the volume of trade. Some researchers observed an indirect effect of exchange rate volatility on international trade. Viaene and Vries (1992) mentioned that the effects of increasing exchange rate volatility on importers and exporters might be different since they are located on different sides of the forward contract. According to this, if the trade balance and any forward risk premium are positive, exporters will lose and importers will benefit. Baak (2008) in a study on impact of the exchange rate volatility on trade between China and US observed negative impact of exchange rate volatility on China's exports to US, but, no effect on US exports. Baak et al. (2007) in another study on impact of exchange rate volatility on exports in four East Asian countries (Hong Kong, South Korea, Singapore, and Thailand) found negative effect of exchange rate volatility on exports of selected countries. Panda and Mohanty (2015) by using Johansen cointegration examined long run effect of real exchange rate volatility on India's exports over the period from 1970-71 to 2011-12 and found negative effect of real exchange rate volatility on India's export. Broll and Eckwert (1999), Doyle (2001) and Ha (2019) claimed that exchange rate volatility and international trade are positively associated. Kang and Dagli (2018) in the context of the global financial crisis used gravity model to examine the impact of real exchange rates on exports of 72 economies over a period 2001–2015 and confirmed that real exchange rate has positive and significant effect on exports. Pham and Tran (2018) used ARDL model on aggregated and disaggregated trade data to assess the impact of VND/ CNY exchange rate on trade flows between Vietnam and China. They mentioned that volatility of exchange rate is more sensitive on export commodities than import commodities. Ozturkand Kalyoncu (2009) by using Engle-Granger cointegration studied the impact of exchange rate volatility on the trade flows of six countries over the period from 1980–2005. The researchers observed long-run

negative impact of exchange rate volatility on real exports for Pakistan, Poland, South Africa and South Korea, and a positive impact for Turkey and Hungary. They also observed exchange rate volatility to be more effective in short run for the sample countries except South Korea and Turkey. Alam (2010) estimated the effect of exchange rate volatility on Pakistan's aggregate export by employing ARDL model on the quarterly data from 1979 to 2005. The results revealed that real effective exchange volatility had significant negative impact of exchange rate volatility on Pakistan's exports in long-run and insignificant impact in short run. Chaudhary et al. (2016) in a study on the relationship between exchange rate volatility and foreign trade of major South-Asian and South-East Asian economies also observed long-run significant relationship between exchange rate volatility and exports in more than half of the sample countries. Alam et al. (2017) investigated the presence of long-run and short-run association of exchange rate volatility on Pakistan's bilateral aggregate exports with its major six trading partner countries viz. Germany, Japan, Saudi Arabia, UAE, UK and US. Due to difference in export elasticities they observed mixed results. Baek (2012) employed ARDL approach to study the short-run and long-run effects of exchange rate fluctuations on disaggregated industry data of bilateral trade between Korea and Japan. The result indicated that Korea's exports and imports are relatively sensitive to the exchange rate in the short-run, but less responsive in the long-run. Bahmani-Oskooee et al. (2012) examined impact of exchange rate volatility on trade of 96 exporting and 29 importing industries of US with South Korea. They observed significant short-run effects of exchange rate volatility on most of the exporting and importing industries. In long run, however, only 16 export and 7 import industries were found to be affected by exchange rate volatility. Bahmani-Oskooee et al. (2016) in another study examined the impact of exchange rate volatility on trade of Pakistan's 44 export and 60 import industries with Japan and found that many industries were not affected by exchange rate volatility either in long-run or in the short-run. Bahmani-Oskooee and Aftab (2017) assessed the asymmetric effects of exchange rate volatility on 54 Malaysian export and 63 import industries involved in trade with the US. The result based on nonlinear ARDL model suggested that almost one third industries were affected by exchange rate volatility in asymmetric manner.

In Indian context, Ranadive and Burange (2013) analyzed the factors affecting real exchange rates by using an ARDL model. They observed that determinant such as productivity difference and foreign exchange reserves have significant impact only in long run. Whereas, government expenditure, economic openness, inflation differentials, interest rate differentials and terms of trade have significant impact on the real exchange rate in the short as well as in long run. Behera *et al.* (2008) and Ranadive and Burange (2014) examined the effectiveness of the RBI intervention on the rupee-US \$ exchange rate by applying GARCH model. The researchers found that the intervention does not affect the level of the rupee exchange rate.

Though, various studies, e.g., Dholakia and Saradhi (2000), Veeramani (2008), Jayachandran (2013), Srinivasan and Kalaivani (2013), Bhattacharya and Mukherjee (2014), Gondaliya and Dave (2015), Panda and Mohanty (2015), Haider and Adil (2017) made attempts in different ways to examine the impact of exchange rates volatility on the India's trade performance, none focused on the effect of real exchange rate volatility on India-US exports. Present study tries to fill this vacuum. It attempts to investigate the long-run and short-run impact of real exchange rate volatility on India's exports to US by employing bound test and error correction model.

Among the major trading partner countries, United States is India’s largest trading partner. India enjoys a favourable balance of trade with United States at an increasing pace. The export grew at a compound annual growth rate (CAGR) of 11.22 percent while import grew by 11.17 percent from 1991 to 2018. India’s bilateral trade with US has witnessed a significant jump from US\$ 4.8 billion in 1991-92 to USD 84.62 billion in 2018-19 (about 10.17 percent of India’s total trade). India’s total exports to the US has increased at a rapid pace in recent years and stood at USD 51.61 billion in 2018-19 (approximately 15.97 percent of India’s total exports) as against USD 46.07 billion during the year 2017-18. Likewise, United States is India’s second largest import partner (after China) with 6.48 percent share in India’s total imports during 2018-19. In 2018-19, India imports from United States stood at USD 33.00 billion as against USD 24.06 billion in 2017-18 (see Figure-1).



Source: Direction of Trade Statistics (compiled), IMF Database

Data Collection and Methodology

Data Collection

The paper considers quarterly data for the period from 1991-Q1 to 2018-Q4. All the variables such as India’s exports to US, economic activity in US and exchange rate are collected from IMF - International Financial Statistics (IMF-IFS) and Direction of Trade Statistics (IMF-DOTS) database. For maintaining uniformity in analysis, all the data are taken in US Dollars.

For transforming nominal to real data (inflation adjustment), of variables under consideration the nominal data are deflated by their relevant price index. The description of variables is as follows:

Real Export: Most of the studies have used export price/ unit value index as the deflator for real export. However, there is no separate export price index and unit value (data available from 2004-Q4) for export in India. Therefore, for extracting real data on India's exports, the nominal data is deflated by consumer price indices (CPI) of India (see Alam, 2010 and Bhattacharyya and Rit, 2018).

$$X_t = \ln \left(\frac{NX}{CPI_i} \right)$$

Here, X_t stand for India's real export to US, NX is India's nominal export to US and CPI_i means Consumer price Index of India.

Foreign Economic Activity: According to the export demand model, the principal determinants of the demand for home country exports depend on the trading partner's income/ foreign economic activity and the real exchange rate (Bahmani-Oskooee and Ardalani, 2006; Heim, 2017). Therefore, industrial production index (IPI) of United States is used as a proxy for foreign economic activity. It is expected that an increase in economic activity in industrial trading partner country should promote trade. In other words, industrial production growth in the US leads to an increase in India's exports to US. The same measure was used as a proxy for economic activity in many recent studied such as, Doyle (2001), Oztuok (2009), Alam (2010), Bahamani-Oskooee(2017).

Real Exchange Rate: The real exchange rate (RER) is calculated by considering nominal exchange rate (NER) of INR-USD; consumer price indices of India (CPI_{ind}) and the consumer price indices in US (CPI_{us}) – (Base 2010=100) see for instance; Baak (2008), Srinivasan and Kalaivani (2013), Bahmani-Oskooee and Aftab (2017). The real exchange rate (RER) is calculated by using formula:

$$RER = \ln \left(NER \times \frac{CPI_{us}}{CPI_{ind}} \right)$$

Real Exchange Rate Volatility: Following, Baak et al. (2007), Baak (2008), Ozturk and Kalyoncu (2009) and Panda and Mohanty (2015) the exchange rate volatility is estimated by using moving average standard deviation. It is expressed as:

$$V_{ijt} = \sqrt{\frac{1}{m} \sum_{k=tm}^{tn} (\ln RER_{ijt+i-1} - \overline{\ln RER_{ij}})^2}$$

Here, V_{ijt} stands for India-US bilateral exchange rate volatility; t denotes for time (i.e., quarter); m represents number of periods (i.e., 2 period moving average); $\ln RER_{ijt}$ is the natural log of real exchange rate; $\overline{\ln RER_{ij}}$ is the mean of $\ln RER_{ij}$ from $k = tm$ (last quarter) to $k = tn$ (first quarter).

Finally, all the variables are transformed into natural logarithms.

Research Methodology

Before applying the cointegration test, it is important to check the order of integration of all variables in time series analysis. If variables of interest are stationary at first difference i.e., $I(1)$, then either

Johansen or ARDL cointegration tests can be used. If variables are mixed order of integration or some are stationary at I (0) and others are stationary at I (1) then the ARDL method is most appropriated (Shrestha and Bhatta, 2018). One more advantage of ARDL model is that it is suitable for determining the cointegration in small size samples (Ghatak and Siddiki 2001). Based on the result of unit root test (see table-1), we employed ARDL approach.

The autoregressive distributed lag (ARDL) approach to cointegration and error correction model is used to investigate the long-run and short-run relationship among variables under consideration. Before implementing ARDL model, it is necessary to determine the optimum lag. It is also important to check whether data at selected lag length do not have problem of serial correlation. Once the orders of the lags in the ARDL model have been appropriately selected, then we can estimate the cointegration relationship using a simple Ordinary Least Square (OLS) method.

To examine the impact of exchange rate volatility on India’s exports to US, the model is specified as:

$$\ln X_{tind} = Q_0 + Q_1 \ln RER_t + Q_2 \ln IP_{tUS} + Q_3 \ln V_t + [t \dots\dots\dots (1)$$

In above equation (1) $\ln X_{tind}$ represents natural log of India’s real exports to US, $\ln RER_t$ stands for real effective exchange rate i.e., per dollar against Indian rupees, $\ln IP_{tUS}$ is industrial production indices of United States, $\ln V_t$ refers to bilateral exchange rate volatility, t is for time, and $[t$ is the stochastic error term.

The equations ARDL model in the present study is specified as:

$$D(\ln X_t^{ind}) = \alpha_0 + \sum_{i=1}^p \alpha_1 D(\ln X_{t-i}) + \sum_{i=1}^q \alpha_2 D(\ln RER_{t-i}) + \sum_{i=1}^q \alpha_3 D(\ln IP_{t-i}^{US}) + \sum_{i=1}^q \alpha_4 D(\ln V_{t-i}) + \alpha_1 \ln X_{t-1} + \alpha_2 \ln RER_{t-1} + \alpha_3 \ln IP_{t-1}^{US} + \alpha_4 \ln V_{t-1} + \varepsilon_t \dots\dots\dots (2)$$

In equation 2, D represents first difference, p and q are the lag orders, α signs show summation coefficients of the short run effect of bilateral real exchange rate, industrial production in partner country and real exchange rate volatility on India’s exports to US, and Q estimates the long run relationship.

Here, null hypothesis (H_0) is that there is non-existence of the long run relationship ($Q_1 = Q_2 = Q_3 = Q_4 = 0$) and the alternative hypothesis (H_1) is that there exists long run relationship among variables under consideration, i.e., $Q_1 \neq Q_2 \neq Q_3 \neq Q_4 \neq 0$.

In ARDL model the bound testing is used to test the null hypothesis of no cointegration; and the value of F-statistics calculated by using Wald coefficient restrictions tests whether there exists long run relationship. If calculated value of F-statistics exceeds the upper critical value (given by Pesaran et al., 2001), it supports the rejection of null hypothesis and indicates that there exists long run relationship among variables under consideration. On the contrary, if calculated F- statistic value falls below a lower critical tabulated value, it supports the non- rejection (acceptance) of null hypothesis, meaning that there is no long run relationship exists. The F-statistics value falling between upper and lower bound indicates that result is inconclusive.

The short run model describing relationship between real exchange rate, US industrial production, and bilateral exchange rate volatility with India’s exports to United States using error correction term is determined as:

$$D(\ln X_t^{ind}) = \alpha_0 + \sum_{i=1}^p \alpha_1 D(\ln X_{t-i}) + \sum_{i=1}^q \alpha_2 D(\ln RER_{t-i}) + \sum_{i=1}^q \alpha_3 D(\ln IP^{us}_{t-i}) + \sum_{i=1}^q \alpha_4 D(\ln V_{t-i}) + \lambda ECT + \varepsilon_t \quad \text{.....(3)}$$

In the above equation, all variables are previously defined. Where, symbol δ shows the speed of adjustment to the long run equilibrium after having a disturbance in the short run. Parameters $\delta_1, \delta_2, \delta_3,$ and δ_4 indicate short run dynamics.

Results and Discussion

This section contains the results of unit root test, ARDL model diagnostic test and stability test, long run and short run estimations of the variables used in the study.

Unit Root Test

The unit root test is employed to verify the order of integration of the variables. A time series variables are said to be stationary or non-unit root if the statistical properties such as mean, variance and covariance, etc. all are constant overtime. The Augmented Dickey Fuller (ADF) Unit Root is used to check the stationarity of time series data of concerned variables.

Table - 1: ADF Unit Root Test

Variables	t-statistic*	Critical value at 5%	P-value	Order of integration
LnX	-5.56	-2.88**	0.00	I(1)
LnRER	-3.59	-3.45***	0.03	I(0)
LnIP ^{us}	-4.71	-2.88**	0.00	I(1)
LnV	-7.74	-2.88**	0.00	I(0)
* All tests are performed by using Schwarz Info criterion, ** denotes model with intercept, *** model with intercept and linear trend.				

* All tests are performed by using Schwarz Info criterion, ** denotes model with intercept, *** model with intercept and linear trend.

Table - 1 makes it clear that all the variables are stationary either at I(0) or I(1); none of them are found to be stationary at I(2). Hence, ARDL model developed by Persaran et al. (2001) can be used for further analysis.

ARDL Model

The results of most popular Schwarz information criterion (SIC) applied through VAR lag order selection criteria suggest lag 1 as most appropriate lag length for the model. To ascertain the goodness of fit of the model, the stability test i.e., cumulative sum of recursive residuals (CUSUM) test is applied (see fig 2and 3). For testing the null hypothesis ‘there is no serial correlation in the model’ Breusch-Godfrey Serial Correlation LM Test is used. It is accepted at 5 percent level of significance because the Chi-Square P value in our model (equation - 2) is 0.0708 (see table-2).

Table - 2: LM Test

F-statistic	3.05933	Prob. F(1,98)	0.0833
Obs*R-squared	3.26537	Prob. Chi-Square(1)	0.0708

Bound F-test for Cointegration

The Wald test is applied to check whether there exists cointegration. The test results presented in table-3 indicate that the value of F-statistics is greater than the upper bound value at 10 percent as well as 5 percent level of significance (Persaran et al., 2001); hence the null hypothesis of no cointegration is rejected. Thus, it is confirmed that there exists long run cointegration among the variables under consideration.

Table - 3: Calculated F-statistics and Critical Value

Dependent variables	F-statistic	P-value	Outcome
$LN X^{ind}$ (LnX/LnRER, LnIP ^{US} , LnV)	6.628515	0.0001	Cointegration
Level of significance		10 Percent	5 Percent
Lower bound value, I(0)		4.04	4.94
Upper bound value, I(1)		4.78	5.73

Long-run Estimations of Export Demand Function

The results of long-term relationship of real exchange rate (LnRER), US industrial production (LnIP^{US}), and bilateral exchange rate volatility (LnV) with India's exports to US (LnX^{ind}) are shown in table-4. It shows negative (-0.996156) and statistically significant coefficient for real exchange rate (LnRER) meaning that one percent increase in real exchange rate will decrease the India's aggregate exports to US by 0.996 percent. In contrast, the coefficient of US industrial production (LnIP^{US}) is positive (1.528615) and statistically significant. It indicates that one percent increase in US industrial production will result into 1.529 percent increase the India's aggregate export demand in US. The impact of real exchange rate volatility (LnV) is not found to be statistically significant with India's exports to US.

Table - 4: Long-run Export Model Analysis

Dependent variable	Independent variables		
	LnRER	LnIP ^{US}	LnV
$LN X^{ind}$	-0.996156	1.528615	-0.133351
t-statistics	-11.89470	19.16244	-1.152595
Prob.	0.0000	0.0000	0.2516

Short-run Model and Error Correction Model Specification

The short run relationships among the relevant variables are shown in table 5 it indicate that the P-value of LM test Chi-Square is 0.7157; which means the null hypothesis is accepted at 5 percent level and there is no serial correlation in the model.

Table - 5: Error Correction Representation of ARDL Model

Dependent variable $d(\text{LnX}^{\text{ind}})$				Wald test
Independent variables	Coefficient	t-statistic	Prob.	
C	0.011129	1.251109	0.2137	
D(LnX(-1))	-0.329365	-3.441355	0.0008	
D(LnRER(-1))	-0.460220	-1.571145	0.1192	0.1161
D(LnIP ^{US} (-1))	0.20986	0.325274	0.7456	0.7450
D(LnV(-1))	0.096881	1.044906	0.2985	0.2961
ECT(-1)	-0.239939	-2.909002	0.0044	
Serial Correlation LM test Chi-Sq.= 0.7157				

The result of Wald test explicates that the null hypothesis of no short run causality among the variables are accepted. It means, in short run, real exchange rate, economic activity in US and exchange rate volatility does not caused India’s export demands in United States. The coefficient of error correction term (ECT) indicates the speed of adjustment towards long run equilibrium should be negative and statistically significant. The negative coefficient tells us the correction of the previous year’s errors in the subsequent period. The result of our model reveals that the estimated coefficient of the ECT is negative and statistically significant at 5 percent level of significance. This indicates that 24 percent is the speed of adjustment of short run shocks to the long run equilibrium within a quarter.

Stability Test Parameter

In this paper, to ascertain the goodness of fit of the model, the stability test i.e., cumulative sum of recursive residuals (CUSUM) test is applied. Figure 2 and 3 figures show that CUSUM value of both, the long run as well as short run model lies within the range (between the critical bounds) at 5 percent level of significance; hence it can be concluded that the models are structurally stable.

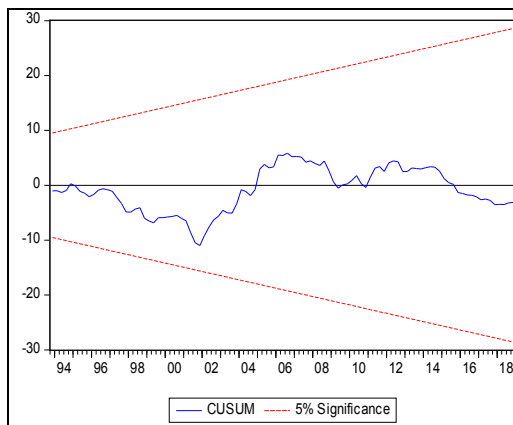


Fig-2 CUSUM Test for Long-run model

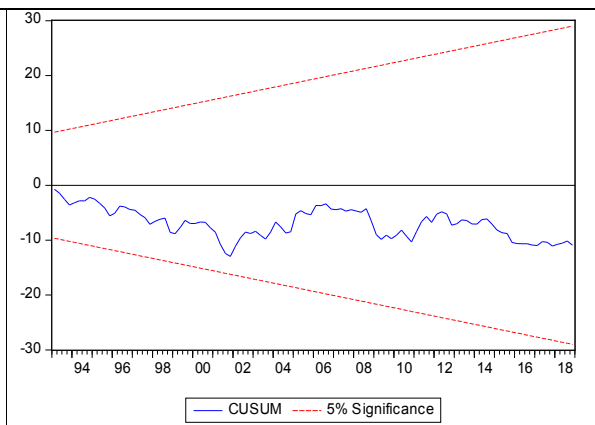


Fig-3 CUSUM Test for short-run model

The results of this study are in line with the previous studies based on aggregate export data such as Dholakia and Saradhi (2000), Bhattacharya and Mukherjee (2014), and Pham and Tran (2018) found a significant relationship between exchange rate and aggregate exports but exchange rate volatility has no significant effect on the aggregate exports in both long-run and short-run.

Conclusions

This paper examines the impact of the real exchange rate and its volatility on India's aggregate exports to United States by using ARDL approach. The results of this study are in line with the previous studies those based on aggregate data analysis. The empirical results based on cointegration analysis reveal that in long-run, real exchange rates has significantly negative and US industrial production growth has significantly positive relation with India's exports to US. The real exchange rate volatility is found to have no significant relation with India's exports to US in both short-run and long-run. The study, however did not observe dynamic short-run causality among the variables. The estimated coefficient of error correction term is negative and statistically significant; which explicated that the adjustment of short-run shocks towards long-run equilibrium at the speed of 24 percent within a quarter in the export model. Based on the findings of the study, it is concluded that exchange rate volatility does not adversely affect India's exports to United States. So it is clear that the level of exports in India is mainly affected by other factors, not by the real effective exchange rate volatility. However, this study recommends that the Reserve Bank of India (RBI) should consistently monitor the foreign exchange market to protect real exports from exchange rate volatility and also try to moderate it whenever the exchange rate fluctuations breach a particular level. Though, this study is limited to aggregated Indo-US trade data because of the non-availability of the industry-wise/ commodity-wise quarterly data for the period under consideration. Future studies may examine the impact of exchange rate volatility on disaggregated trade data to document more comprehensive results.

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Identifying Decisive Drivers of Regional Rural Banks in India : A Multi Factor Sensitivity Analysis

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ABSTRACT

The financial linkage towers of rural India from which banking services are emanated, specifically the Regional Rural Banks (RRBs), have recently gained significant research attention owing to the role they can play in making Atmanirbhar India with the fund related intermediation services. Identification of influential factor(s) and operational sensitivity of a set of drivers can signal whether chosen strategy is truly beneficial or not in the form of benchmarking score. This study identified seven decision scenarios and five key drivers in a measure-specific benchmarking framework, it then extracted the effectiveness ratings with changes in magnitude of the key driver(s) of the fifty-one banking units for the last three years. The findings evidently support that though the financial return in creating bankable opportunities does not remain stable over time, but their efficiency gain in employee engagement and exposure in branch productivity are reassuring and many of them are geared on the same route to push their frontier of banking strength through strategic choice of composite key drivers. This study goes beyond the function that we normally consider as performance evaluators and the evidenced-based outcome will help bank practitioners avoid mindless replication.

Keywords: *Multi-Factor Optimization, Sensitivity Analysis, Driver-Specific Score, Rural Banking.*

Introduction:

With the global pandemic, the recent shifting paradigm of economy -as if for the first time- from global to reach local is undoubtedly a transformative opportunity for ground breaking practices of local outreach and financial inclusion through increase access to credit (Florian & Alexandra, 2020); by the Regional Rural Bank in India, the excellence of service boundaries of which are neither too narrow nor too broad (Anjini, 2018); (Burgess & Pande., 2005). In such a downturn internally homogeneous banking units who are closely tied to local society and culture (Clark & Radic, 2018), can best help the rural inhabitants by strengthening the weaknesses and exploiting their strength (Alexandra & Pierluigi, 2019). A Regional Rural Bank (RRB) is popularly known as 'Grassroot Level Bank' which operate mainly to

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cater the savings and credit needs of small and marginal farmers, landless laborers, artisans, and common people of the far-flung rural India with a plethora of activities ingetting their support and improving a better livelihoods now and in the future(Simon & Gregory, 2010). In recent years, sweeping outreach of these banking units at every doorsteps of rural India are stories of exceptional banking services that have broken the all odds in terms of micro branch expansion to total business operations (Abhishek & Rupayan, 2019), and this success and trust of rural inhabitants can further led them more extension of activities in key areas of growth process of the country (Swamy, 2019); (Prabhakar & Sabah, 2018). While representative statistical data on sectorial variations of operational effectiveness resulting from individual bank functioning are not available but these issues are frequently contested (Vaidehi & Mudit, 2019). Apart from the own shortcomings of small size, structural differentiation, and functional process, a wide variety of factors are also contributing this desperate state of affairs and operational performance (Degryse & Ongena, 2007). Issues of non-performing assets, operational inputs and financial costs minimisation (Sealey & Lindley, 1977), service outreach, employee cooperation(Kaur & Kang, 2020), and overall productivity (Sunil & Rachita, 2010), substantially impact the bank stability and progress. Identification of these obvious and explanatory set of elements and identification of measure-specific elements from branch productivity, financial return, and employee efficiency flanks can help functional restructuring (Satya & Ruoayan, 2013); and judging the best possible outreach programme for these small banks to carry out their official mandate. At present 51 Number of RRBs are delivering their services throughout the country for improving their capability and operational effectiveness.

Recent business trends in the banking sector that continues to become more flooded with commercial giants who have different mandates and competencies for change and choices (Bhide & Ghosh, 2002), put these local small units into fixes of how to survive, thrive, and make a great difference (Shwete & Anand, 2020), in the way taking lending and investment services to the rural poor and how these small units required to repeat those experiences with their associated units in the similar network. The growth trend of the economy undoubtedly indicates that to explore new outreach, this sector needs to adhere with shared commitment for a worthy goal and that can be strengthened only by a best practice which combines the best of innovation with tested experience (Hakenes & Xie, 2014). Even though the policy makers have paid attention to local contexts and the goal, interests, and activities of actors in these contexts but in practice the lack of prioritizing many unresolved issues relating to “context” and “process” of these small banking units and more willingness to treat them as functional substitutes of large commercial bank have not been seen in recent past. To implement effective local outreach where they are, is an adaptive challenge that cannot be solved only through more branch expansion and employee engagement but can only be resolved in a carefully managed process. To date, more is known about why this small banking unit underperformed than under which process many such units prospered in challenging environment. The main focus is to find the answer of how do these small banking units manage to continue and expand official mandate in vuca environment? But the answer of this question is strongly interrelated with financial return and total business performance that the unit can gain in dealing with the input and output resources. The purpose of this research study is to empirically evaluate the adaptive choices in reaching the outgrowth challenges through performance benchmarking among the banking units operating throughout the country. The next section of this paper provides a review of literature. It is followed by a section on research question and methodology wherein the detailed computational procedures are emphasized. Then, the paper gives the detailed description with analytical

argument under the framework of DEA sensitivity results of best practice performance and to see whether the banking units under study behave differently in terms of the decisive factor(s) within and between the DMUs over the years. The last section concludes the study with implication and future scope of study.

Literature Review:

This review looked at a variety of sources on value-driven strategic choices and possibility in financial inclusion literature and found numerous interesting studies in the banking domain. Given the geographic scope and cultural differences access to use of financial services is significant both at the bank and firm level across the country (Ryan & Sherrie, 2017); and is considered as public policy issues (Ronald, 2010). While the relevant literature in development studies is rich in explaining the development failure or success of countries (Owen & Pereira, 2018); (Hanlon & Hulme, 2010), but the unequal effects of liberalization often contested (Mohammad & Ahmed, 2020); (Li & Li, 2019); (Sailesh & Glauco, 2017). State level performance under economic reform in general (Fiordelisi & Mare, 2014); and individual bank specific determinants and level of performance of Indian Banking system are critically evaluated (Ramprasad & Stelios, 2019); (Ghosh & Ansari, 2018). Research on performance measurement and productive strength of business in general and banking performance in India indicates that best practice branch performance has undergone with radical outreach over a period of time (Singh & Thaker, 2016). Previous studies on this domain provides varied evidence on the operating capability, profitability, capital adequacy and branch expansion aspects across banks that affect non-performing assets in banking sector (Jaslene & Sankarshan, 2019); (Baidya & Mitra, 2012). Beginning with the sustainable banking performance of the Indian banking sector (Kumar & Prakash., 2019), several contributions (Singh & Kansal, 2016) emphasized on comparative productivity scenario of public and private sector bank in Indian context and suggested measures not only to improve profitability but to extend outreach activities too (Kunannatt, 2008). Trends of productive performance in terms of cost, revenue, and profit efficiency in response to financial deregulation and market changes (Narwal & Pathneja, 2016); (Gulati, 2015). Both internal and external determinants are emphasized as driving forces (Zhang & Aboud, 2019), in managing service quality and the financial performance of the banks with respect of size, composition and activities in Indian context (Mayur & Saravanan, 2017).

A survey of Indian banking and finance literature reveals that many banking units are not dealing adequately with the massive non-performing assets and credit risk in the Indian banking sector (Rachita & Sunil, 2019) (Jayadev, 2013). Many banking units manage to diversify their high-risk loan and branch expansion activities through employee support and clients' trust building (Nansru & Rentala, 2019). As there are many driver specific choices from a menu of treatments from non-performing assets monitoring, manpower engagement to branch expansion activities (Mohammad & Ali, 2019); (Joseph & Haiyan, 2011); which support to evaluate the differential level of measure -specific achievement- the extent to which alternate treatment of decisive factor can influence the outreach (Vidyarthi, 2017), and that the outcomes activities (Schotter & Yorulmazer, 2009), through identified decisive drivers. A very large set of research relating to impact assessment of operating expenditure on performance management highlighted that higher employee downsizing enhances the contemporaneous efficiency and significant with concurrent asset reduction or repeated episodes (Chun-Lin & Ming-Yuan, 2020). Apart from non-performing assets, several studies also red-flagged massive employee costs and emphasized that

operational and marketing inefficiency are the assigning factors gripping near death of many banking units. Highlighting the profitability performance of public sector banks in India numerous studies found that interest costs, interest income, other income, deposits per branch, credit to total assets and proportion of priority sector advances were key determinants of profitability of these banks (Ahamed, 2017); (Sreejata & Malathi, 2015); (Barry & Poonam, 2013). Recent studies in developing countries found that banks with higher credit risk and loan concentration exhibit lower profitability levels (Zhang & Cai, 2015). On the other hand, bank that has a higher level of capitalization, higher proportion of financial returns, and low operational costs proved to be relatively higher in performance benchmarking (Joseph & Choon-Geol, 2019); (Panagiotis & Konstantinos, 2018); (Zedda, 2017).

Having sufficient familiarity and critical appraisal of the relevant literature, this study accordingly proposes to gain an insight in identifying the decisive-drivers and the unique nature of branch expansion activity with the total business and net worth capacity in terms of the multiple ranges of decision issues that the RRB units are currently attempting to optimize and to see whether there are any uniformity in the performance grade between the banking units under study. The next explicit issue is to resolve which decisive factor(s) is strategically crucial from a bundle of key drivers through measure-specific score. The purpose is to see whether the banking units under study behave differently in terms of the decisive factor(s) within and between the DMUs over the years.

Objectives and Significance:

This study is about measuring change (and stability) in performance effectiveness at the individual bank level from panel data analysis. The specific objective is to focus on the unique nature of branch expansion activity with the total business and earning capacity in terms of the multiple ranges of decision issues that these units are currently attempting to optimize and to see whether there is inconsistency in the performance grade between the units under study. The next explicit purpose is to focus on the decisive factors on a bundle of tangible activities covering financial return, number of branches, employee engagement, and total business, as these are more regular in banking operation of the sample units through measure-specific score. Thus, a factor that is decisive to the performance should be characterized by whether the factor is significant in maintaining the best-practice for efficient unit and achieving the best-practice for inefficient unit. With the help of branch productivity, financial return, and employee efficiency to total business and net worth as output variables of the banking unit, the efficient frontier is required to be evaluated under seven decision scenarios of the banking units. Then, considering the financial return, branch productivity, and employee engagement as decisive factor, performance score of each specific driver are to be calculated to see whether the banking units under study behave differently in terms of these decisive factors. Thereafter, whether these efficiency gain improved or remain stable over the years of the banking units are to be tested with repeated measures multivariate and averaged test of significance (panel study) method

Research Question and Hypothesis:

The key question is how to improve managerial decision and how to steer and control different decision drivers with respect to best practice benchmarking. This study posits the argument that with a set of multiple performance measures, when one or more elements are found influential in maintaining and achieving the best practice, the decision-making unit (DMU) should consider that element or a set of elements as decision value driver to that banking unit and thus there is scope to improve the

performance. Considering the conceptual framework, the objectives of the study and the burden to prove the research question as amplified above, the below stated hypothesis is deduced from the theoretical propositions.

H₀: With a set of multiple drivers, the RRBs in India are not sufficiently capable in achieving the adequate standard when measured through driver-specific benchmarking during the study period.

H_A: With a set of multiple drivers, the RRBs in India are sufficiently capable in achieving the adequate standard when measured through driver-specific benchmarking during the study period.

Data and Methodology:

One of the important objectives of RRBs in India is to serve the farthest inhabitants but plausibility of which are primarily dependent on survival strategy and thriving performance, and these multiple conditions induces to select a particular set of performance measures, proactive priority of which can be improved. Measure-specific models take sets of explicit inputs or outputs of interest and the target values for only those critical issues (Aydin & Kazim, 2010). The use of the measure-specific model can be suitable for the situations where only one or some of the inputs or outputs can be mediated (Kao, 2020); (Chinmoy, 2017). In order to obtain an overall performance score, (Zhu, 2000) utilized measure-specific transformation process by a set of inputs and outputs in measuring the corporate effectiveness and similarly for operational effectiveness of banking business (Rishabh & Kumar., 2019); (Bhatia & Dash, 2018) in general and branch effectiveness relating to customer expectations in particular (Wasan, 2018) ; (Saha & Yeok, 2018). This study identified five decision drivers of which three of them are inputs namely Financial returns (F), Employee efficiency (E), Branch productivity (B), and two measures as outputs namely the Net worth (N), and Total business (T). As we are interested in measuring potential contribution of various inputs to the current level of net worth and total business, we applied output oriented VRS model and then to measure the critical input measures we applied input oriented VRS to get the performance sensitivity scores over the last three years. Further, whether these efficiency gain improved or continued stable over the years of the banking units are to be tested with repeated measures multivariate and averaged test of significance (panel study) method.

The following is the individual measure specific model when the kth input measure is of interest for a particular DMU0: *Min P_k* Subject to

$$\begin{aligned}
 & \sum_{j=1}^n \lambda_j x_{kj} \leq P_K x_{k0} \\
 & \sum_{j=1}^n \lambda_j x_{ij} \leq x_{i0} \quad i \neq K \quad \dots \quad (A) \\
 & \sum_{j=1}^n \lambda_j y_{rj} \geq y_{r0} \quad r = 1, \dots, s \\
 & \sum_{j=1}^n \lambda_j = 1
 \end{aligned}$$

When $P_k \hat{A} 1$, it indicates that inefficiency exists in DMU0's k th input, because DMU0 needs to decrease its k th input to \hat{A} in order to reach the performance frontier. When a set of inputs and outputs has to be adjusted simultaneously, we need to consider the measures in groups as follows:

Min GM

Subject to

$$\sum_{j=1}^n \lambda_j x_{ij} \leq G_M x_{io} \quad i \in M$$

$$\sum_{j=1}^n \lambda_j x_{ij} \leq x_{io} \quad i \notin M \quad \dots \quad (B)$$

$$\sum_{j=1}^n \lambda_j y_{rj} \leq y_{ro} \quad r = 1, \dots, s$$

$$\sum_{j=1}^n \lambda_j = 1$$

And, *Max H_Q*

Subject to

$$\sum_{j=1}^n \lambda_j y_{rj} \geq H_Q y_{ro} \quad r \in Q$$

$$\sum_{j=1}^n \lambda_j y_{rj} \geq y_{io} \quad r \notin Q \quad \dots \quad (C)$$

$$\sum_{j=1}^n \lambda_j x_{ij} \leq x_{io} \quad i = 1, \dots, m$$

$$\sum_{j=1}^n \lambda_j = 1$$

Where inputs represented by set M and outputs represented by set Q are of interest. It is intended to assign $\text{Max } \{G^*M\}$ and $\text{Min } \{H^*Q\}$ when a bank unit is found inefficient to identify the most decisive input and output measures, respectively. But when a bank unit is found efficient, infeasibility associated with the form-(B) and form-(C) indicates the non-critical inputs and outputs. It is assumed that the DEA model exhibits constant returns to scale (CRS).

Analysis and Findings:

To identify the decisive driver(s) to the net worth and total business under the multiple best-practice framework, the DEA sensitivity assessment is carried out and Table-1 depicts the results obtained with the model-A and model-B of the DMUs under study. The results of the output oriented VRS efficiency scores for (DMU1) Andra Pradesh GVB clearly exhibited that during the preceding three years it attained the best practice efficiency level. With model (B), branch productivity input appeared as the decisive measure in the year 2016-17, but with the same model, the subsequent period results showed infeasibility when all the three inputs are under consideration. We therefore employ model (B) for all possible

combinations of the three drivers, the last column of the respective period reveals the results of bank performance with the key determinants. It appears that in Andra Pragati GB when the model (A) applied for each input measure at a time the input individually does change the efficiency classification of (DMU2) because the possible inefficiency is existed in each associated input when other inputs are fixed at their current level. So a set of inputs is adjusted simultaneously and applied for all possible combinations of the three input measures and when return, employee, and branch productivity on net worth and total business are selected respectively at a time in favour of model (B), it appears that the optimum yield is derived from the selected grouping in the year 2016-17. The game changing source of efficiency in the succeeding years, financial return is found the only key factor in the Andra Pragati GB's performance. About (DMU3) Chaitanya Godavari GB, and (DMU4) Saptagiri GB, it is found that overall inefficiency existed over the years and the model yields the optimal value when financial return is under consideration during the entire study period for both the decision-making units.

Table-1: Factor-Specific Efficiency (VRS) Score of the DMUs

DMUs.	2016-2017						2017-2018						2018-2019					
	O	R	B	E	A	B	O	R	B	E	A	B	O	R	B	E	A	B
DMU ₁	1.00	Inf	1.09	Inf	B	BE	1.00	Inf	Inf	Inf	*	RBE	1.00	Inf	Inf	Inf	*	RBE
DMU ₂	1.14	0.87	0.60	0.76	RBE	*	1.12	0.87	0.65	0.64	R	*	1.00	1.28	Inf	Inf	R	RB
DMU ₃	1.16	0.86	0.06	0.43	R	*	1.31	0.71	0.38	0.37	R	*	1.30	0.73	0.42	0.51	R	*
DMU ₄	1.31	0.76	0.08	0.42	R	*	1.30	0.73	0.34	0.33	R	*	1.31	0.73	0.39	0.41	R	*
DMU ₅	1.00	1.20	Inf	Inf	R	RB	1.02	0.98	0.44	0.39	R	*	1.08	0.79	0.44	0.43	R	*
DMU ₆	1.00	1.01	Inf	Inf	R	RB	1.07	0.93	0.70	0.82	R	*	1.17	0.84	0.68	0.78	R	*
DMU ₇	1.20	0.82	0.54	0.70	RB	*	1.30	0.77	0.60	0.54	R	*	1.04	0.92	0.60	0.48	R	*
DMU ₈	1.09	0.91	0.09	0.66	RB	*	1.00	Inf	1.23	Inf	B	RB	1.00	Inf	1.25	Inf	B	RB
DMU ₉	1.12	0.89	0.10	0.54	RB	*	1.11	0.82	0.87	0.91	RBE	*	1.00	Inf	1.17	Inf	B	RB
DMU ₁₀	1.09	0.91	0.14	0.59	RB	*	1.36	0.72	0.65	0.63	RB	*	1.26	0.73	0.63	0.71	RE	*
DMU ₁₁	1.04	0.95	0.77	0.92	RE	*	1.24	0.76	0.57	0.50	R	*	1.13	0.85	0.58	0.55	R	*
DMU ₁₂	1.16	0.86	0.08	0.53	RB	*	1.22	0.78	0.51	0.47	R	*	1.20	0.80	0.49	0.46	R	*
DMU ₁₃	1.38	0.73	0.72	0.89	BE	*	1.01	0.99	0.83	0.91	R	*	1.00	1.04	Inf	Inf	R	RB
DMU ₁₄	1.24	0.80	0.26	0.78	RE	*	1.35	0.70	0.62	0.51	RB	*	1.40	0.65	0.57	0.59	RB	*
DMU ₁₅	1.16	0.86	0.19	0.74	RB	*	1.04	0.95	0.99	0.77	RB	*	1.00	Inf	1.10	Inf	B	RB
DMU ₁₆	1.11	0.90	0.21	0.77	R	*	1.36	0.67	0.59	0.73	RE	*	1.26	0.73	0.56	0.76	RE	*
DMU ₁₇	1.05	0.95	0.55	0.66	R	*	1.37	0.68	0.71	0.64	RBE	*	1.33	0.67	0.74	0.72	RB	*
DMU ₁₈	1.10	0.85	0.70	0.88	RE	*	1.41	0.71	0.57	0.64	RE	*	1.13	0.84	0.61	0.71	R	*
DMU ₁₉	1.00	Inf	1.04	Inf	B	RB	1.18	0.82	0.62	0.62	RB	*	1.30	0.74	0.66	0.70	RB	*
DMU ₂₀	1.00	Inf	Inf	Inf	*	RBE	1.13	0.81	0.71	0.82	RE	*	1.00	Inf	Inf	Inf	*	RE

(Contd...)

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DMU ₂₁	1.00	Inf	Inf	Inf	*	RBE	1.00	0.98	0.98	0.95	R	RBE	1.02	0.91	0.84	0.93	RE	*
DMU ₂₂	1.08	0.92	0.50	0.84	RBE	*	1.00	Inf	Inf	Inf	*	RBE	1.00	Inf	Inf	Inf	*	RBE
DMU ₂₃	1.07	0.93	0.43	0.75	R	*	1.00	Inf	Inf	Inf	*	RBE	1.13	0.87	0.70	0.72	R	*
DMU ₂₄	1.12	0.89	0.32	0.62	R	*	1.09	0.89	0.86	0.81	RB	*	1.24	0.75	0.82	0.82	RBE	*
DMU ₂₅	1.13	0.88	0.52	0.87	RBE	*	1.10	0.88	0.80	0.69	RB	*	1.26	0.80	0.78	0.69	RB	*
DMU ₂₆	1.05	0.95	0.76	0.88	RE	*	1.18	0.82	0.58	0.58	RE	*	1.33	0.72	0.55	0.62	R	*
DMU ₂₇	1.12	0.89	0.23	0.58	RE	*	1.00	1.22	Inf	Inf	R	RB	1.17	0.82	0.79	0.85	RE	*
DMU ₂₈	1.19	0.83	0.13	0.45	R	*	1.23	0.82	0.67	0.69	R	*	1.05	0.80	0.77	0.88	E	*
DMU ₂₉	1.00	Inf	Inf	Inf	*	RE	1.38	0.73	0.47	0.51	R	*	1.10	0.86	0.48	0.54	R	*
DMU ₃₀	1.10	0.89	0.53	0.85	RBE	*	1.40	0.72	0.34	0.38	R	*	1.16	0.80	0.32	0.44	R	*
DMU ₃₁	1.01	0.99	0.93	0.97	R	*	1.00	Inf	Inf	Inf	*	RBE	1.00	Inf	Inf	Inf	*	RE
DMU ₃₂	1.08	0.91	0.67	0.44	RBE	*	1.12	0.88	0.71	0.77		*	1.20	0.72	0.71	0.84	RE	*
DMU ₃₃	1.00	1.01	Inf	1.04	E	E	1.09	0.89	0.86	0.83	RB	*	1.09	0.92	0.90	0.92	RB	*
DMU ₃₄	1.08	0.91	0.71	0.89	RBE	*	1.13	0.89	0.44	0.29	R	*	1.02	0.94	0.46	0.31	R	*
DMU ₃₅	1.22	0.81	0.05	0.44	R	*	1.00	1.09	Inf	Inf	R	BE	1.00	1.14	Inf	Inf	R	BE
DMU ₃₆	1.04	0.96	0.72	0.91	RE	*	1.08	0.91	0.83	0.85	RB	*	1.07	0.88	0.89	0.87	RB	*
DMU ₃₇	1.05	0.87	0.80	0.92	RE	*	1.25	0.76	0.55	0.49	R	*	1.16	0.84	0.53	0.43	R	*
DMU ₃₈	1.00	Inf	Inf	2.38	E	E	1.40	0.68	0.50	0.53	RB	*	1.38	0.70	0.56	0.59	R	*
DMU ₃₉	1.12	0.89	0.41	0.73	RB	*	1.26	0.76	0.55	0.52	RB	*	1.34	0.72	0.59	0.66	RB	*
DMU ₄₀	1.04	0.95	0.69	0.91	RBE	*	1.31	0.72	0.27	0.39	R	*	1.00	1.00	Inf	Inf	R	R
DMU ₄₁	1.00	1.00	0.97	0.83	*	R	1.02	0.97	0.94	0.92	RB	*	1.00	1.33	Inf	Inf	R	R
DMU ₄₂	1.14	0.87	0.15	0.66	RB	*	1.05	0.86	0.79	0.86	RE	*	1.00	Inf	Inf	1.05	E	E
DMU ₄₃	1.03	0.96	0.73	0.95	RE	*	1.00	Inf	Inf	Inf	*	BE	1.00	Inf	Inf	Inf	*	BE
DMU ₄₄	1.15	0.87	0.13	0.65	R	*	1.16	0.84	0.58	0.64	RB	*	1.29	0.76	0.61	0.77	RE	*
DMU ₄₅	1.11	0.90	0.08	0.59	R	*	1.13	0.86	0.73	0.83	RE	*	1.10	0.89	0.70	0.68	R	*
DMU ₄₆	1.13	0.88	0.39	0.71	R	*	1.00	1.02	Inf	Inf	R	RB	1.36	0.66	0.45	0.47	R	*
DMU ₄₇	1.03	0.97	0.73	0.70	R	*	1.28	0.73	0.65	0.65	RB	*	1.06	0.91	0.90	0.92	RBE	*
DMU ₄₈	1.00	Inf	3.65	Inf	B	B	1.04	0.96	0.72	0.83	R	*	1.49	0.67	0.40	0.51	R	*

Note: O= Optimal Value without Choices, R=Financial Return, E=Employee Efficiency, B= Branch Productivity, A= Model-A, and B= Model-B. All Seven Scenarios' Results are Reflected in A and or B.

It is discernible that the model (A) is infeasible when employee and branch productivity inputs are selected in (DMU5) Arunachal Pradesh RB, but the model B yields the optimal value when the return is under consideration. This indicates that once the three input measures are considered, the magnitudes of employee and branch productivity do not affect the efficiency status, but the size of financial return affects the efficiency status of the banking unit given the current level of employee and branch capacity and hence financial return is the critical factor to Arunachal Pradesh RB's performance. For (DMU6) Assam GVB has the optimal solutions when the return is taken as key influencing factor. But, (DMU7) LangpiDehangi GB depicts optimal solutions when financial return and branch productivity are in combined grouping in the year 2016-17 and then in subsequent periods financial return alone is the decisive driver for the optimal level of operations. Similarly, (DMU8) Uttar Bihar GB shows best solutions when financial return and branch productivity are in combined grouping in the initial period and then in succeeding years branch productivity on its own is the decisive driver for the optimal level of operations. Chhattisgarh Rajya GB, DMU9, which was inefficient in the year 2017 and 2018 with return and branch productivity as critical measures in the year 2017 and all the set of inputs in the year 2018 to achieve the performance frontier but achieved optimal value in the year 2019 with branch productivity as decisive driver. Next three units namely DMU10, DMU11, and DMU12, indicates possible inefficiency exists in each associated input when other inputs are fixed, but when return and branch productivity, return and employee productivity inputs are combined as a set the model yields the optimal value in DMU10, and in DMU11, and without grouping only with financial return in DMU12.

A closer look at the efficiency report indicates that the five comparable enterprises namely DMU13, DMU14, DMU16, DMU17, and DMU18, are in inefficient frontier, except the fact that DMU13, and DMU15, achieved the performance frontier in the year 2018-19 with the financial return and branch productivity as their decisive driver. The infeasibility associated with the first, second and third input in DMU19, DMU20, and DMU21, in the initial year indicates that the financial return, branch productivity and employee engagement all the inputs are the critical measure. The value of the financial return, size of employee strength and degree of branch productivity affects the enterprise's efficiency status given the current level of net-worth and total business and hence, all three variables are the critical factors to the DMU22, throughout the study period. Further, the efficiency report in DMU29, DMU33, DMU38, DMU41, DMU43, DMU48, DMU50, and DMU51, indicates that the eight nearly similar banking units all have optimal yields of performance effectiveness derived either from the financial return and or in combination with branch productivity. In order to reach the performance frontier for possible inefficiency, when one input is selected at a time, it appears that out of the fifty-one banking units fifteen banks are inefficient for each in the year 2016-17, seventeen units in the year 2017-18 and twenty-one units in the year 2018-19. The value of the sensitivity reports which eventually indicates high level of inefficiency existed in each associated input when other inputs and output are fixed at their current levels as per formulated optimal values to model (A). It is evident that at least two inputs in combination are the significant factor for total sixteen banking units and out of the total, only nine units attained optimal yield when all the three inputs are the decisive factors in the year 2016-17, likewise six units attained optimal solution when all three inputs are in set in the year 2017-18, and finally in four units all are the significant factors in the year 2018-19.

The above results revealed that the DMUs behaved differently and did not remain stable over the time periods and there are several clusters of banking units which require further study according to the identified dominant factors influencing the relative efficiency scores in terms of their net worth and

total business. To compare the average performance scores of different periods of the same decision-making unit, we carried out multivariate analysis of variance test as a single factor repeated measures and treatments-by-subjects design and the tests results are presented in Table-2. Two multivariate tests are provided here to assess the significance of the repeated measures effect. As the number of subjects in each group is equal it does not matter which test is used (Stevens, 1992).

Table-2: Repeated-Measures Within Subjects Design Multivariate Tests (Panel Study)

Effect	Test Name	Value	F	Hypothesis DF	Error DF	Sig. of F
Year	Pillai's Trace	.199	6.091	2	49	.004
	Wilks' Lambda	.801	6.091	2	49	.004

It is clearly evident that values for both tests are equal and are significant, which indirectly means that the different dimension of functioning do not remain stable over the last three years of these banking units. Even though we need not use a post hoc test but for validation the Tukey test is carried out with the studentized range statistics, a table which can be found in (Stevens, 1992).

Table-3: Repeated-Measures Averaged Test of Significance (Panel Study)

Source of Variation	Sum of Squares	DF	MS	F	Sig. of F
Within Cells	1.086	50	.022	9094.876	.000
Intercept (Year)	196.316	1	196.316		

The within-cells mean-square error term is presented in Table-3 and is about .022. the square root of this divided by the number of cases is .020769. the appropriate studentized range value with 3 groups and 50 degrees of freedom for the error term is 3.42, which finally gives .07103 multiplied value, and is differed by the table value, so they would be significant at the 0.05 level. As both the multivariate and averaged tests are significant, evidently there is significant differences in average performance effectiveness of the banking units over the last three years as well.

Conclusion:

In this study, we assessed the competency in decision-making choices in seven decision scenarios of the RRBs, with five key drivers in a measure-specific benchmarking framework, and then extracted the effectiveness ratings with changes in magnitude of the key driver(s) of the fifty-one banking units for the last three years to contribute new insight about the factor(s) specific performance given the current levels of other factor(s). In order to obtain the static performance index, the output-oriented Data Envelopment Analysis (DEA) is employed and then the input oriented VRS sensitivity analysis is carried out to assess which factor(s) will not affect an efficient DMU's outcome performance given that all other input factors are kept at their current levels. This study offers some answers related to the performance level of these banking units as well as reasons of the results when considering its future policy against other banking units. The results revealed that though the financial return in creating bankable opportunities but it did not

remain stable over time and their efficiency gain in employee productivity and exposure in prevailing branch functioning improved at growing rates which is reassuring, except few banks, and many of them are geared on the same route to push their frontier of banking strength through financial return, employee productivity, and adaptive branch expansion strategy. This finding justifies concerns over the differences in operational effectiveness and the role of decisive factor in improving performance effectiveness. Accordingly, this study accepts the alternative hypothesis and concludes that with a set of multiple drivers, the RRBs in India are sufficiently capable in achieving the adequate standard when measured through driver-specific benchmarking during the past three years. Finally, further study may be conducted to analyze the efficiency scores obtained, and the context-dependent relative attractiveness would be a promising one. The purpose would be to gain new insight and comprehend this issue because choice is often influenced by the context, and to regulate key-driver that managers and policy makers could use to push the performance frontier of the banking sector into sustainable territory in India and across the world.

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Comparative Analysis of Bitcoin, Gold and NIFTY 50 During COVID-19 Crisis

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ABSTRACT

This analysis compared the price and return series of Bitcoin with NIFTY 50 and Gold, both during pandemic and pre-pandemic period, in an effort to determine the effect of COVID-19 on bitcoin. The data consists of Bitcoin, Gold and NIFTY50 daily prices for the period from 1st April 2019 to 30th November 2019 and then from 1st December 2019 to 31st August 2020. This period includes the last 8 months affected by the pandemic and 8 months prior to it. It has been found that Bitcoin does not act as a safe haven for investors who expect steady returns over the period studied. The argument that Bitcoin is another type of gold and provides good returns during the recession is also rejected by findings. It is also argued that the Bitcoin market had not yet grown as a mature source of investment. The investors should diversify the investment by including both Gold and Nifty50. However, steps should be taken by policy makers to promote the Bitcoin as an alternative source of investment.

Keywords: *Bitcoin; Cryptocurrency; COVID-19; Safe haven.*

Introduction

As many cities around the world are sealed up in response to the outbreak of the novel coronavirus, so-called 'Covid-19.' The globe is on the verge of unrepresented pandemic disease. The general opinion of analysts on the global economic shutdown due to the epidemic pandemic is believed to be the primary determinant of financial market instability that may lead to the 21st century's greatest market collapse. Historically, the Black Death of 1347 to 1351 and the Spanish Flu of 1918 to 1919 are just two episodes which are broadly identical. Recent events appeared to have clear, substantial, widespread, serious short-term financial disturbances, and medium-term economic growth and development applications.

Chinese authorities have implemented social distancing policies to reduce infectious disease transmission, impose widespread labor mobility restrictions and travel effective immediately after the Lunar New Year holiday season. The coordinated shutdown of factory production lines means sharp

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cutbacks and a major reduction of manufacturing with eminent economic activity implications. The effect of COVID-19 is portrayed in the financial market during the first half year of 2020.

During this crisis situation, one may question, whether 'bitcoin an investment that is safe'? To answer this, first we have to understand that what is bitcoin. It is a form of cryptocurrency, a virtual currency. Cryptocurrencies, a new currency that originated when Bitcoin was formed in 2009, became widely recognized as a fascinating alternative to conventional national fiat currencies like the Euro and the US Dollar in the middle of the last decade. Early adopters and enthusiasts admire cryptocurrencies for their freedom from any monetary authority and low transaction costs and foreshadow a promising as an independent exchange value store medium. The first, the most common and liquid cryptocurrency, is the Bitcoin which has already been stated. When bringing their savings and earnings into high street banks, the secret lies in how safe and comfortable the daily investor feels. How can a daily investor feel comfortable by investing their money in unregulated, inscrutable digital environment, many of which still struggle to understand the fundamentals of technology?

The white paper by Santoshi Nakamoto outlining the bitcoin concept outlines the idea for a framework that "allows online payments to be sent directly from one party to another without passing through a financial institution." Another key figure in bitcoin's roots, W. Dei shares his obsession with the notion that "the share is not temporarily broken but permanently prohibited and permanently unnecessary." The 2002 Crypto Anarchist Manifesto describes a technologically empowered society in which participants can "communicate and connect entirely anonymously with each other."

It then becomes apparent that there are three pieces of the roots of cryptocurrencies. The first is the urge to abolish the power and influence of government in favor of an anonymous online culture. The second is the idea of a different, digital cash from financial institutions. The third is the invention and application of those technologies and techniques that allowed it. Money is historically an accounting system which is issued by a central body. Bitcoin is an open ledger accounting system which records the value and transactions. Monitoring and reviewing the ledger removes the power of the 'middle-man.' Hypothetically, this reduces the corruption opportunity. The overarching message is that as a way of circumventing conventional banking conglomerates that have endured accidents contributing to customer mistrust, bitcoin was invented. It is no coincidence that the bitcoin white paper was written some weeks after the Lehman Brothers Collapse of 2008. Insufficiencies in the banking sector and the growth of cryptocurrency are inextricably connected.

The use of cryptocurrencies has traditionally spiked in times of great political, social and economic turmoil. Following the financial crisis of 2008, there was a collapse in confidence and belief in conventional institutions, which served as a trigger for the usage in cryptocurrencies and, in times of uncertainty, started to depend on a decentralized currency. This allowed the regular consumer to monitor their funds and eliminate the financial institution's God-like central figure, setting prices and regulating the currency flow. For instance, during Zimbabwe's Mugabe crisis, the use and prices of bitcoin spiked. In an attempt to evaluate the impact of COVID-19 on bitcoin, this study compared the price and return series of Bitcoin with NIFTY 50 and Gold. NIFTY 50 act as the indicator of stock prices and Gold being considered as actual safe heaven justify my comparison with Bitcoin, as they are suggested by some of the analyst for being lucrative investments during time of crisis.

Review of Literature

Nakamoto, S (2008), without depending on trust, he suggested a system for electronic transactions. He continued with the traditional digital signature coin system, which gives clear defense of ownership but is incomplete without double-spending being stopped. He proposed peer-to-peer network to record a public transaction history using evidence-of-work to solve double spending problem. He provides the benchmark work in the field of digital currency. Vora, G. (2015), studied the creation of Bitcoin and its sister currencies and considered to be a significant disruptive financial breakthrough that remains here, unless compromised by poorly considered legislative or regulatory measures. The final conclusion is that cryptocurrencies and alternatives to virtual currencies are a welcome growth option, offering competition for existing money and government regulatory modalities, provide alternative means for their transactions to economic agents. Bouri et al. (2017), analyze if Bitcoin serves as a safe haven for big world stock indexes, equities, energy, copper, the general asset index and the US dollar index, it uses complicated conditional correlation model. Normal and weekly outcomes cover the period from 2011 to December 2015. The findings indicate that Bitcoin is a poor hedge and is only sufficient for purposes of diversification. Corbet et al. (2018), examine the interactions between three famous cryptocurrencies and a number of other financial tools. They find evidence that these properties are relatively different from economic and financial properties. The findings suggest that cryptocurrencies can have diversification advantages for investors with small investment horizons. Klein, T., Thu, H. and Walther, T. (2018), demonstrates that bitcoin and gold could hardly be more distinct. In times of market distress under financial markets, gold plays a major role in flight-to-quality. Bitcoin does the exact opposite and correlates favorably with down markets, according to results. They conclude that, as currencies and linkages to financial markets, Bitcoin and Gold have fundamentally different properties. Smales, Lee A. (2018), conducted research to check whether Bitcoin can be considered as safe haven, as historically described during periods of market stress by its correlation with other assets. He observed even under normal market conditions, Bitcoin is more volatile, less liquid and more costly for transactions than other currencies. Aysan et al. (2019), explores the predictive capacity of the Bitcoin regular returns and market volatility index of the global geopolitical risk (GPR) over the period July 18, 2010 to May 31, 2018. The results indicate that Bitcoin's returns are negatively related to GPR, while their volatility is positively related to GPR. They concluded that to diversify global geopolitical threats Bitcoin can be used as a hedging mechanism. Guesmi et al. (2019), explores discretionary cross-effects between Bitcoin and financial indices and the spillover of uncertainty are being examined. They show that in the Bitcoin market, a short position provides the scope for risk investment's hedging for all the various financial assets. Finally, relative risk of the portfolio consisting only gold, equity and oil, with the other portfolio including gold, oil, equity and Bitcoin hedging strategies significantly mitigate the risk of the portfolio. Shahzad et al. (2019), they define safe haven property of Bitcoin differently. that is fragile and strong. The analysis focuses on many stock indices comprising United States, China and other emerging and developing economies, with a sampling period from 19 July 2010 to 22 February 2018. They show that the safe-haven positions of Bitcoin, gold and commodities vary in time and differ across the financial market indexes under analysis. Urquhart, A. and Zhang, H. (2019), explores whether Bitcoin can serve as a hedge against world currencies or as a safe haven. Contrary to earlier researches, because Bitcoin experiences very high volatility during the day, they evaluate the relationship between Bitcoin and

currencies at the hourly frequency. Their observations also suggest that Bitcoin acts as an intraday hedge, diversifier and safe haven for some currencies, which will be of particular interest to holders of currencies, cryptocurrencies and high frequency. **Alfaro et al. (2020)**, show that unexpected shifts in the COVID-19 infection trajectory forecast, in real time, US stock returns. The findings suggest that, even as infections continue to increase, stock markets may begin to recover if the disease's trajectory becomes less serious than initially expected. **Corbet, S., Larkin, C. and Lucey, B. (2020)**, indicates that during this time of tremendous financial stress, there has been an important improvement in the volatile relationship between the main Chinese stock markets and Bitcoin. During periods of tension, these complex correlations offer additional data to cautiously endorse the legitimacy of the growth of this modern financial commodity within the conventional portfolio architecture through the benefits of diversification.

Objectives of the Study

Cryptocurrencies precisely Bitcoin hasn't been extensively discussed, being comparatively new form of currency which still in the stage of evolution. Researchers have made efforts to analyze and examine the proclaimed credibility of Bitcoin specifically during stress time. Since, we are facing the unforeseen contingencies of Covid-19 which has changed the whole world both physically and financially. Thus, it's time to analyze, whether Bitcoin still serve as an alternate source of investment or safe haven during this pandemic time. The primary objective of the paper is to evaluate the change in bitcoin prices and their returns over the pandemic period and pre-pandemic period. The study also compares the change in bitcoin prices and their returns with that of gold and NIFTY 50 during both the periods. In last an attempt has been made to compare the change in bitcoin prices during pandemic period with that of pre-pandemic period.

Data & Methodology

Data set the sample consists of Bitcoin, Gold and NIFTY 50 daily prices, which are to be separated into two separate time frames, i.e. from 1 April 2019 to 30 November 2019 and then from 1 December 2019 to 31 August 2020. The explanation for this period is that it covers the last 8 months affected by the pandemic and 8 months before the pandemic. The log naturals of the data are then estimated in order to prevent data heterogeneity. The returns series are determined by excellent in order to evaluate change over the duration for the aforesaid investment option. Using e-views tools to perform descriptive statistics and graphical analysis.

Analysis and Interpretation

First of all, in order to know the specific essence of various price series, descriptive statistics of the data have been determined. Table 1 for pandemic times and Table 2 for pre-pandemic times summarize these results.

Table 1: Descriptive Statistics During Pandemic Period

	LN_BITCOIN_P	LN_GOLD_P	LN_NIFTY_50_INDEX
Mean	9.066704	7.439943	9.271432
Median	9.114391	7.440968	9.307667
Maximum	9.415939	7.635014	9.422407
Minimum	8.481773	7.304583	8.937251
Std. Dev.	0.186886	0.084692	0.12419
Skewness	-0.46397	0.31135	-0.5354
Kurtosis	2.991018	2.27622	2.110017
Jarque-Bera	9.867438	10.44556	22.21425
Probability	0.0072	0.005392	0.000015
Sum	2493.344	2045.984	2549.644
Sum Sq. Dev.	9.569821	1.965325	4.225933
Observations	275	275	275

Table 2: Descriptive Statistics During Pre-Pandemic Period

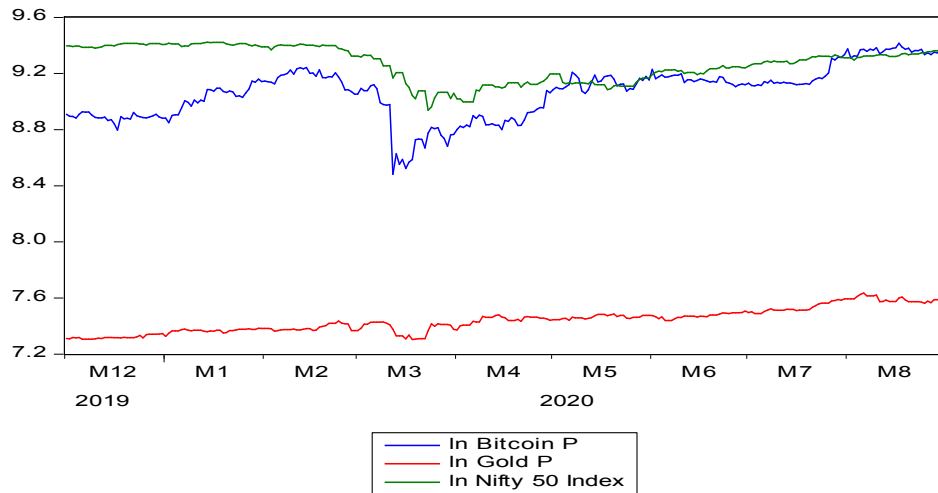
	LN_BITCOIN_P	LN_GOLD_P	LN_NIFTY_50_INDEX
Mean	9.044489	7.279954	9.351308
Median	9.073655	7.290804	9.358541
Maximum	9.4776	7.369853	9.405179
Minimum	8.329682	7.152973	9.278448
Std. Dev.	0.247978	0.060222	0.031356
Skewness	-0.81258	-0.44434	-0.46783
Kurtosis	2.884642	1.727859	2.014132
Jarque-Bera	26.98672	24.4822	18.78187
Probability	0.000001	0.000005	0.000083
Sum	2206.855	1776.309	2281.719
Sum Sq. Dev.	14.94285	0.881292	0.238923
Observations	244	244	244

The above table shows the averages along with the degree of variations in the Bitcoin, Gold and NIFTY 50 price series. It reveals that NIFTY 50 price averages are higher than Gold and Bitcoin during the COVID-19 pandemic phase, still Bitcoin experience high volatility as shown by greater standard deviation. It illustrates that Bitcoin and NIFTY 50 offers high yields and more uncertainty during a pandemic scenario. It means that Bitcoin acts as a safe haven for investors, but that consumer trust is

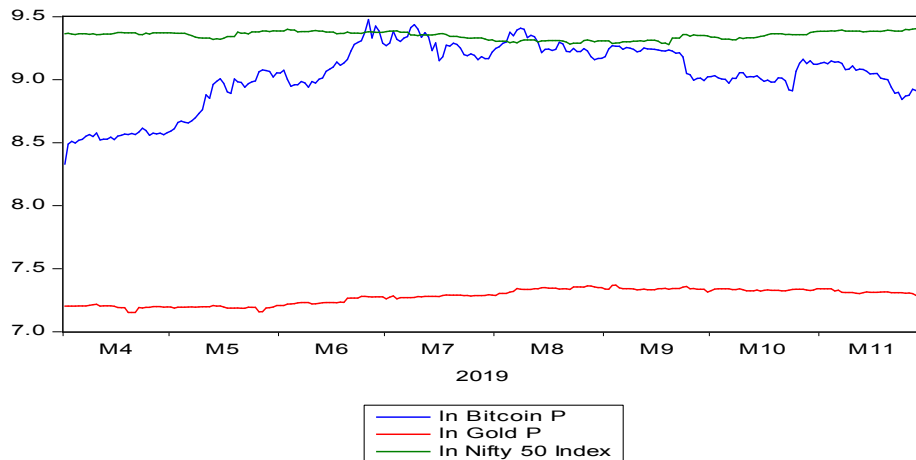
lacking, resulting in high risk. Moreover, the variability in Gold prices during pandemic period is almost half in comparison to Bitcoin also it is quite lower than NIFTY 50. If we equate the same variables during the pre-pandemic period, we find that the average prices of Bitcoin and gold are little lower, while NIFTY 50 indices perform better during pre-pandemic period. The degree of variability is also low for NIFTY 50 followed by Gold. However, Bitcoin prices during pre-pandemic exhibits high liquidity in comparison to pandemic period. In short, the market volatility for Gold and NIFTY 50 during the pre-pandemic era is lower, while Bitcoin is more volatile during the said period.

Graphical representation of the same series during all the above-mentioned cycles is prepared in order to explain and analyze the shifts in certain price series more effectively. As seen in Graph 1 and Graph 2, this representation also reveals the same effects as of descriptive statistics.

Graph 1: Graphical Representation of Price Series during Pandemic Period



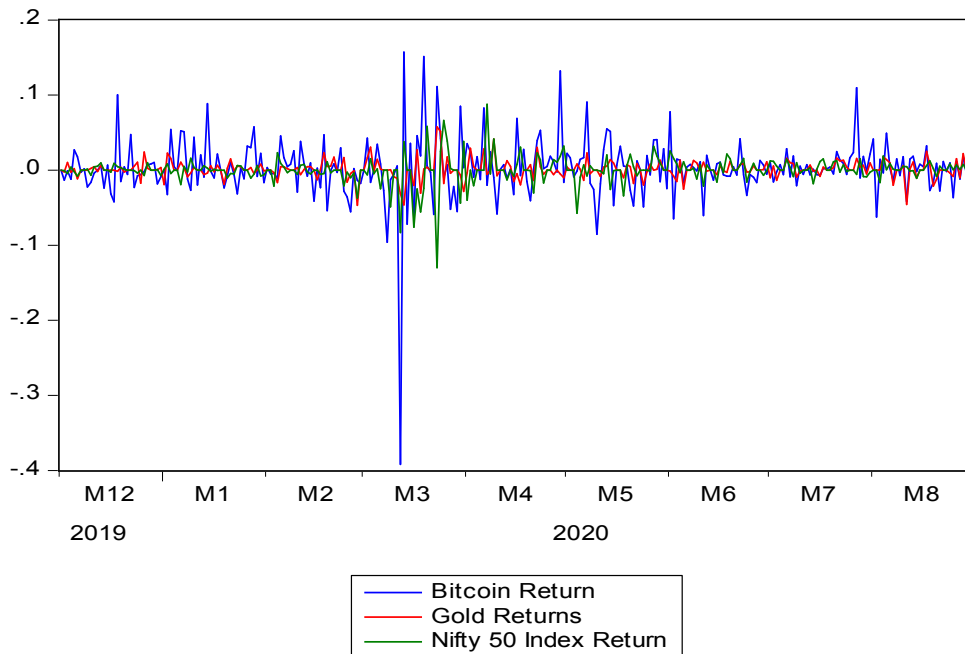
Graph 2: Graphical Representation of Price Series during Pre-Pandemic Period

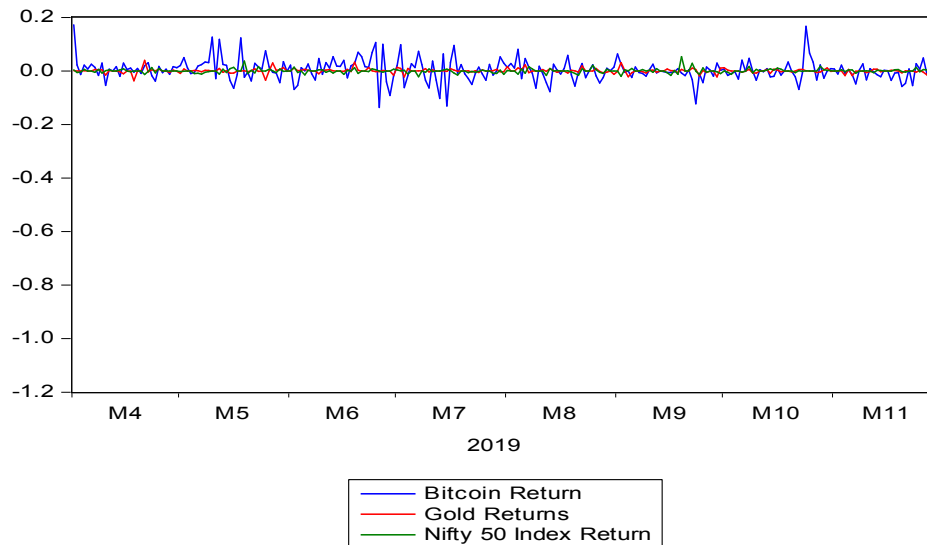


From the above graphs, the high degree of uncertainty of Bitcoin prices can be easily traced, which is explained earlier with the descriptive performance. It was also noticed that, relative to Bitcoin and NIFTY 50, gold prices show less variability, resulting in the most stable investing mode during both the time periods under consideration. Although Gold and NIFTY 50 prices are more or less steady relative to Bitcoin prices prior to the pandemic. Bitcoin values display greater market variability, both in the pandemic and in the pre pandemic time, with only shifts in the degree of variability over those years as during normal situation it represents higher volatility as compared with pandemic period. For those expecting continuous returns, all this makes Bitcoin a volatile form of investing.

Thereafter, we analyze the degree of heterogeneity in the return series of Bitcoin, Gold and NIFTY 50. As seen in Graph 3, i.e., the return series graph, the variance in the return of Bitcoin during the pandemic situation is quite beyond limits. Like the price series, NIFTY 50 and Gold returns tend to be stable in normal conditions, although the return of Bitcoin shows variation. However, for Bitcoin's returns, the degree of variations is comparatively low during regular times, but still higher than other two investment options. In other words, it can be seen that the returns of Bitcoin often reflect shifts in returns, even during normal periods. This suggests that Bitcoin has not yet evolved as a matured form of investment.

Graph 3: Graphical Representation of Return Series during Pandemic Period



Graph 4: Graphical Representation of Return Series during Pre-Pandemic Period

Summary and Conclusion

Bitcoin is a form of cryptocurrency, a virtual currency. Cryptocurrencies, a new currency that originated when Bitcoin was formed in 2009, became widely recognized as a fascinating alternative to conventional currencies like Euro and US Dollar in the middle of the last decade. It is no coincidence that the bitcoin white paper was written some weeks after the Lehman Brothers Collapse of 2008. Insufficiencies in the banking sector and the growth of cryptocurrency are inextricably connected. Thus, during the COVID-19 crisis situation, one may question, whether 'bitcoin an investment that is safe'? In an attempt to evaluate the impact of COVID-19 on bitcoin, this study compared the price and return series of Bitcoin with NIFTY 50 and Gold. NIFTY 50 act as the indicator of stock prices and Gold being considered as actual safe heaven justify my comparison with Bitcoin, as they are suggested by some of the analyst for being lucrative investments during time of crisis. Data set the sample consists of Bitcoin, Gold and NIFTY 50 daily prices, which are to be separated into two separate time frames, i.e. from 1 April 2019 to 30 November 2019 and then from 1 December 2019 to 31 August 2020. The explanation for this period is that it covers the last 8 months affected by the pandemic and 8 months before the pandemic.

Analytical studies suggest that Bitcoin offers high yields with greater uncertainty during a pandemic scenario. It means that it fits some of the investor's safe haven expectations, but that there is a loss of consumer faith that results in high risk. It was also noticed that, relative to Bitcoin and NIFTY 50, gold prices show less variability, resulting in the most stable investing mode during the pandemic time. In conclusion, Bitcoin doesn't serve as a safe haven for investors during the study period. In addition, some researchers' argument that Bitcoin is another type of gold and provides good returns during the recession era was also discarded as per the study. Bitcoin values have the same trait, i.e. high uncertainty relative to the other two investing types, during pandemic and pre-pandemic time.

It is also argued that the Bitcoin market had not yet grown as a mature source of investment, which meant that policy makers had to follow techniques to promote the development of such a market in order to support long-term investors as well.

Contributions and Implications

The Bitcoin as being a new investment asset is yet at an infant stage of development. Also, the market of Bitcoin is not a much regulated one to safeguard the interest of the investors. The comparison done in the study among Bitcoin, Nifty50 and Gold as an investment options during crisis period may be used further by investors to diversify their investment. The investors can diversify their portfolio based on their risk preferences for risk and returns as Nifty50 is giving highest returns in the pre-pandemic period but Gold is giving stable returns during pandemic period as well as during pe-pandemic period. Therefore, investors should include both of these two in their portfolio. However, for Bitcoin to be accepted by maximum investors as a safe option for investment, further time and regulation is needed.

The study can also be useful for the policy makers to introduce Gold bonds as a safe investment opportunity during crisis period. As it will be helpful to keep the money in the market to maintain the flow of money. Also, the steps should be taken to put efforts to make Nifty50 a more stable investment during crisis and efforts should be made to build trust among investors regarding Bitcoin so as to reap its benefits.

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Impact Analysis of Indian Accounting Standard (Ind Ass) on Specific Components of Financial Position Statement

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ABSTRACT

In the current research paper, the impact of Implementation of Ind-ASs on specific components of financial statements in terms of structural changes for 6 years (2014 to 2019) is discussed. Decomposition Measure technique was applied to analyse the structural changes in 3 main components (Fixed Assets, Equity & Long-term Debts) of the financial statements. The results indicate that in the 2016 and 2017 financial years, a significant structural change occurred in all these three components as high decomposition measure was recorded for each of them. But the statistical t-test concluded that Ind-ASs have no significant effect on the components of financial statements. The present study shall contribute to corporate sectors in order to take various financial decisions relating to investing and financing activities and in determining of the value of the firm. In all these decisions fixed assets, equity and long-term debts play a vital role. So, the structures of these components have been analyzed systematically by applying Decomposition measure after Ind ASs came into force. After the implementation of Ind AS, the accounting of these components has been affected to a great extent. So, the present study will be helpful for the corporate sector in making future financing and other decisions.

Keywords: *Ind AS, Implementation, Financial Statement components, Fixed Assets, equities and long-term debt.*

Introduction

The implementation of Indian Accounting Standard (Ind ASs) converged with International Financial Reporting Standard (IFRSs) by Indian companies is a monumental step in the accounting history of India. It is due to globalization that the international business and cross border investments increased which necessitated to have a single set of globally accepted financial reporting system. The use of

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different accounting principles in different countries, lead to inconsistent accounting treatments and different representations of the same economic transactions which created confusion for the users of financial statements in different countries. This confusion also created inconsistency in the global capital markets. To resolve this issue, the International Accounting Standard Board (IASB) issued IFRS to provide common accounting principles so that the transparency in the presentation of financial statements can be increased. In India, Ind-ASs which are converged with IFRS are applicable. Before the introduction of Ind. AS financial statements were prepared according to the Accounting Standards (AS), which were not in line with the standards and principles that were applicable globally (IFRS). Due to this investors were not able to assess and compare the financial position of Indian companies with other global companies. To make the financial statements comparable, IND-ASs were introduced which are converged with IFRS (global standards). The introduction of IND-ASs will bring consistency in the accounting practices and principles followed by companies in India and the companies across the world, leading to enhanced accessibility and acceptability of financial statements by global investors. After their implementation in 2015-16, they were adopted by the Indian Corporate sector on a mandatory basis. In this study, an attempt is made to examine the impact of implementation of Ind-ASs on various components of financial statements of the Indian corporate sector by analysing the structural changes in the composition of various components. For this purpose, the data of 6 years has been taken into consideration (2013-14 to 2018-19) and the decomposition analysis technique is applied. Decomposition analysis is an analysis of a set of data to break its composition and determine the extent of change in its components over the time. This analysis will help the financial analysts or business decision-makers to understand the significant changes that have occurred in the structure of fixed assets, equities and long term debts over the period and that can be compared. Thus, in this study the decomposition analysis pinpoints the areas of significant change in the composition of fixed assets, equities and long term debts so that decision-makers can investigate the particular year in which the significant structural change took place.

Review of Literature

The first application of decomposition analysis to financial statements was by (Theil 1969). He argued that decomposition could be used as a “summarizing descriptive device for changes” in the composition of a firm’s balance sheet. Further development of the use of decomposition analysis for analyzing financial statements was undertaken by Lev (1971), (1974), (1973). He offered an economic rationale for the use of decomposition analysis. Two empirical studies using decomposition analysis – (Lev 1971) & (Moyer 1977) - have examined the usefulness of decomposition measures for predicting corporate bankruptcy. (Lev 1971) found that (1) decomposition measures are generally larger for failed than for non-failed firms, (2) the LDM is generally larger than the ADM, (3) the BSDM was a better predictor of failure than the ADM or LDM, (4) the larger the time elapsed between balance sheets, the better the predictive power, and (5) the BSDM generally outperformed thirteen financial ratios when each was used as a univariate predictor of bankruptcy. Work by Theil (1972) has indicated some general patterns for decomposition measures. First, LDMs are usually larger than ADMs. Second, BSDMs, ADMs and LDMs are generally larger for small firms than for large firms. Finally, these measures are generally larger for firms producing durable goods than for the firms producing nondurable goods. Another potential use of decomposition measures was examined by Belkaoui (1976). He calculated the decomposition measures for 25 Canadian companies that were taken over by other firms and compared

them to the decomposition measures for a group of 25 non-acquired firms. He found that the acquired firms generally had larger decomposition measures than their non-acquired counterparts. He also reported that the BSDM had more discriminating ability than the ADM or LDM, although the difference was not large. He also found the LDMs to be larger than the ADMs.

PWC Ind AS (2016) impact analysis report analyzed the impact of Ind-ASs on financial statements of 75 companies that were listed on the National stock exchange (NSE) of India. 17 companies were excluded from these 75 companies which were either banking or non-banking financial companies or insurance companies as Ind-ASs are not yet applicable on these firms. Report is based on quarterly published reports that do not provide a detailed disclosure of all the facts. Report showed a different area of accounting having a significant impact on taxes (88%), financial instrument (including derivatives) (85%), revenue (84%), retirement benefit obligation (67%), share-based payment (23%) and Business combination (16%).

The Institute of Chartered Accountants of India (2018) published report “**Indian Accounting Standard (IFRS converged): Successful Implementation impact analysis and Industry experience**”. In which they examined the quantitative and qualitative impact of the Ind-ASs on the financial statements of 170 companies for the year 2016-17 spread across 15 sectors. The results revealed that on the overall basis there was a marginal decrease of 1.87% in reported revenue, the net negative impact of Ind-ASs on PAT was 0.93%, positive impact on the equity component was of 4.10%, the total carrying amount of tangible assets was decreased by 0.4% reflecting the immaterial impact of IND-ASs convergence. Intangible assets have been an exception to general trend with a significant decrease of 19% in carrying amount. There is reduction of 2% in the total assets and total borrowing also showed a reduction of 4.84% which is not considered as the significant impact of IND-ASs Implementation.

Although the impact of Ind AS on various financial components has been analysed by a lot of well renowned accounting firms like PWC and ICAI, yet none of these have analysed the structure of these financial components in terms of relative importance. In the present study, a statistical tool “Decomposition Measure” has been used to analyse the impact of Ind AS on financial statements. Also, we can notice that prior studies have covered only a period of two years before and after implementation of Ind AS which is not enough to justify the any impact on financial statements. So, in this study 6 years have been considered i.e. 3 years before and 3 years after Ind ASs came into force.

Objectives

To examine the impact of Ind-ASs on fixed assets, equities and long term debt of the Indian Corporate Sector.

Null Hypothesis

H01: There is no significant impact of Ind-ASs on components of fixed assets which includes tangible assets, intangible assets, capital work in progress and intangible assets under development of selected sample units of the Indian Corporate Sector.

H02: There is no significant impact of Ind-ASs on components of equities which includes equity share capital, reserve & surplus, revaluation reserve and equity share application money of selected sample units of the Indian Corporate Sector.

H03: There is no significant impact of Ind-AS components of long-term debts which includes long term borrowing, deferred tax assets (Net), other long term debt and long term provision of selected sample units of the Indian Corporate Sector.

H04: There is no significant difference among sample units of significant decomposition measures (DM) of various components of the balance sheet.

H05: There is no significant difference among various significant decomposition measures (DM) of selected sample units of the Indian Corporate Sector.

Statistical Tools

To analyze the impact of Ind-ASs' implementation on fixed assets, equities and long term debts in financial statements, the decomposition analysis technique has been used. It is a suitable technique for analyzing the structural changes in a financial statement. For the test of significance of the null hypothesis certain statistical tests have been applied like; t-test and chi-square test. Descriptive statistics (mean, standard deviation and covariance) is also taken into account to examine the characteristics of the data.

This study discusses three components of Balance sheet i.e. Fixed Assets, Equity and Long term Debts. These three aspects have been selected because in the previous studies major impacts have been reported in them after the implementation of IND-ASs. The other reason to select these aspects is that they keep their ratio high in the balance sheet. In the present study all sample firms' financial statements show that on an average 60% proportion of balance sheet is covered by equity, 17% by long term debts and 43% (approx.) by fixed assets which proves that these components hold a high proportion in the Balance Sheet. Therefore, to find the impact of the implementation of Ind-ASs these aspects are most important from analysis point of view. The structure of fixed assets includes tangible assets, intangible assets, capital work in progress and intangible assets under development. Equity includes equity share capital, reserve and surplus, revaluation reserve, equity share application money and Long term debts includes long term borrowings, deferred tax liabilities, other long term liabilities and long term provisions.

Period of Study

The period of study covered in the present research work is from 2013-14 to 2018-19 i.e. a study period of 6 years which includes 3 years before and 3 years after the implementation of Ind-ASs. It is considered as an appropriate time period for finding the significant impact on Fixed Assets, Equity and Long Term Debt components after the application of Ind-AS.

Source of Data

This study is purely based on secondary data which has been collected from the audited published annual reports (standalone) of respective companies' websites and ACE knowledge portal database which is available in library of Mohanlal Sukhadia University, Udaipur, Rajasthan

Sample Design

The present research covered the top 10 companies listed on BSE Index. The selection of these companies is based on the market capitalization in 2019. The companies included in the sample are Reliance industry, Tata consultancy services, Hindustan Uniliver limited, Infosys, ITC, Bharati Airtel, Maruti Suzuki, Asian Paints, ONGC and Larsons and turbo. While selecting the sample companies

Banking, Shipping, Financing companies and other service sectors were excluded. All sample units have adopted Ind- ASs from 1 April 2016.

Analysis and Discussion

For examining the structural changes that took place in fixed assets, equities and long term debts after the implementation of Indian Accounting Standards (IND-ASs), Decomposition Measures have been calculated for sample units from different sectors of Indian corporate sector for six years. In this research study a decomposition measure will be considered as significant if, it is higher than the average of decomposition measures for 6 years. (Sharma K.R. 2008)

Table No.1 Decomposition Measures of Fixed assets

SN	Name of Companies	2014	2015	2016	2017	2018	2019	Average	CV (%)
1	RELIANCE INDUSTRIES LTD.	395.150	445.170	104.850	1125.790	416.050	17.810	417.470	93.42
2	TATA CONSULTANCY SERVICES LTD	169.660	182.000	296.250	10.160	23.070	295.620	162.790	77.06
3	HINDUSTAN UNILEVER LTD	74.130	134.980	99.610	109116.800	183.890	21.760	18271.860	243.57
4	INFOSYS LTD.	137.480	125.160	2.770	31.620	473.420	55.410	137.640	125.46
5	ITC LTD.	86.890	251.360	17.150	65.700	101.010	235.740	126.310	75.44
6	LARSEN & TOUBRO LTD.	147.820	27.190	27.210	4015.880	79.160	39.730	722.830	223.28
7	MARUTI SUZUKI INDIA LTD	38.100	146.590	176.130	9.350	147.040	93.670	101.810	65.52
8	BHARTI AIRTEL LTD.	884.730	8804.570	1156.840	843.950	328.090	239.910	2043.020	163.04
9	ASIAN PAINTS LTD.	22.250	461.450	103.840	214.320	3016.160	3018.670	1139.450	128.32
10	OIL AND NATURAL GAS CORPORATION LTD.	36.590	7.660	20049.580	13.600	35.050	19.320	3360.300	243.31
Average of 3 year DM		11537.720			41429.250				
t-test value									
t statistics (paired)		-0.712892717							
t critical two-tail value		4.30265273							
P value		0.549866113							

Source: own calculation through MS-Excel-2007

The above table shows that DM of fixed assets for sample units for a period of six-years i.e. from 2014 to 2019. The highest average DM (18271.86) is reported by Hindustan Unilever Ltd. and the lowest average DM (101.81) is reported by Maruti Suzuki India Ltd.. It indicates that the structural changes in fixed assets of HUL company were the highest.

From fluctuating DM, an abnormal highest (109116.80) in 2017 is being reported by HUL company. As this abnormal highest is recorded after Ind-AS came into force in 2016, it can be assumed that there were major structural changes in accounting of fixed assets after the implementation of Ind-ASs.

CV revealed that the 3 companies, HUL (243.57%), ONGC (243.31%) and Larsons and Turbo (223.28%) have reported CV above 200% which clearly shows that there is high variation in the components of fixed assets of these companies due to change in valuation practices under Ind-ASs. The lowest CV (65.52%) is reported by Maruti Suzuki India Ltd which means least fluctuations in fixed assets components were noticed in this company.

In all 80% of sample units (8 companies) are highly affected because significant DMs have been observed in their fixed assets after 2016. The most affected companies are Reliance Industry, TCS, HUL, Infosys, ITC, L & T, Maruti Suzuki India Ltd and Asian Paints. 20% of sample units (2 companies) are not affected by Ind-ASs implementation as no significant DM can be seen after 2015-2016.

However, individual DM of sample units reported significant structural changes in the components of fixed asset, but overall t-test results show that there are no significant changes between pre and post implementation period of Ind-ASs. Here null hypothesis (H01) is not rejected at 5% level of significance because the calculated value of t-test (-0.7129) is less than the table value (4.3026) and also P-value (0.54) of two-tail test is greater than α of 0.05.

Table No.2 Decomposition Measures of Equities

SN	Name of Companies	2014	2015	2016	2017	2018	2019	Average	CV (%)
1	RELIANCE INDUSTRIES LTD.	26.000	0.285	0.406	0.879	12.505	2.614	7.115	145.593
2	TATA CONSULTANCY SERVICES LTD	14.108	0.000	0.929	6.949	0.000	3.000	4.164	132.897
3	HINDUSTAN UNILEVER LTD	6.887	2.300	26.681	0.083	0.000	0.000	5.992	174.917
4	INFOSYS LTD.	0.000	6.949	7.361	0.000	0.000	30.558	7.478	158.309
5	ITC LTD.	1.925	1.473	0.253	7.391	0.804	1072.829	180.779	241.743
6	LARSEN & TOUBRO LTD.	0.824	0.197	0.098	71.132	1.628	0.309	12.364	232.888
7	MARUTI SUZUKI INDIA LTD	0.000	0.217	0.641	0.000	0.000	0.000	0.143	181.140
8	BHARTI AIRTEL LTD.	1.767	1.535	5.764	0.414	0.011	0.089	1.597	136.014
9	ASIAN PAINTS LTD.	1.942	1.384	1.156	4.312	0.250	0.424	1.578	93.664
10	OIL AND NATURAL GAS CORPORATION LTD.	0.642	0.212	1.128	6.027	0.130	0.333	1.412	162.211
	Average of 3 year DM	3.7688			40.7556				
	t-test value								
	t statistics (paired)	-1.062382349							
	t critical two-tail value	4.30265273							
	P value	0.399377052							

Source: own calculation through MS-Excel-2007

The above table shows DM of Equities for sample units from year 2014 to 2019. The highest average DM(**180.779**) is reported by ITC Ltd and the lowest average DM(**0.143**) is reported by Maruti Suzuki Ltd. This indicates that the highest structural changes for six-year inequities can be observed in ITC Ltd. While the DM have been fluctuating an abnormal highest (**1072.829**) has been reported by ITC Ltd in 2018-19. The second-highest DM(**71.132**) has been reported by LARSEN & TURBO in 2016-17. Both the companies have reported the highest Decomposition measure after 2016-17, which is an evidence to the fact that major structural changes occurred in the equity components after the implementation of Ind-AS.

The study shows that 2 companies ITC (241.343%) and LARSEN & TOUBRO Ltd (232.888%) have reported CV above (200%), which means high variations are present in the components of equities of these companies due to the valuation practices under IND-ASs. The lowest CV (93.669%) is reported by ASIAN PAINTS Ltd. This shows low variations in components of equities. The 70% of sample units (7 Companies) are affected by the implementation of Ind-AS because significant DM has been observed after 2016-17 in them. The most affected companies are RELIANCE INDUSTRIES Ltd, TATA CONSULTANCY SERVICES Ltd, INFOSYS Ltd, ITC Ltd, LARSEN & TOUBRO Ltd, ASIAN PAINTS Ltd, AND ONGC Ltd, whereas 30% (3 companies) remain unaffected by the implementation of IND-ASs as no significant decomposition measure was observed in these companies for even once after the year 2016-17.

However, individual DM of sample units reported significant structural changes that took place in the structure of equities, but overall ‘t’ (paired) test results show that no significant changes took place between pre and post implementation period of Ind-ASs. Here null hypothesis (H02) is not rejected at 5% level of significance because the calculated value of t-test (-1.06) is less than the table value (4.30) and also the P-value (0.399) of two-tail is greater than α of (0.05)

Table No.3 Decomposition Measures of Long Term Debts

SN	Name of Companies	2014	2015	2016	2017	2018	2019	Average	CV (%)
1	RELIANCE INDUSTRIES LTD.	45.312	435.985	0.000	135.319	102.478	14.800	122.316	132.536
2	TATA CONSULTANCY SERVICES LTD	423.022	209.012	233.313	10.895	60.263	489.899	237.734	80.190
3	HINDUSTAN UNILEVER LTD	225.490	125.345	784.207	179.557	0.525	68.274	230.566	122.592
4	INFOSYS LTD.	1663.314	0.000	0.000	0.000	32791.956	30.558	5747.638	230.799
5	ITC LTD.	16.488	25.707	14.843	9.992	69.766	20.992	26.298	83.507
6	LARSEN & TOUBRO LTD.	188.661	36.611	21.120	119.863	16.048	194.313	96.103	86.243
7	MARUTI SUZUKI INDIA LTD	122.031	614.974	6113.280	129.619	14.099	23.400	1169.567	207.949
8	BHARTI AIRTEL LTD.	121.818	366.343	320.386	194.379	3.557	6.468	168.825	91.195
9	ASIAN PAINTS LTD.	43.764	15.496	126.403	186.298	10.198	48.689	71.808	97.236
10	OIL AND NATURAL GAS CORPORATION LTD.	6.498	25722.602	128.688	70.096	5.316	1.969	4322.528	242.543
	Average of 3 year DM		1271.6904			1166.9863			
t-test value									
	t statistics (paired)	0.291626242							
	t critical two-tail value	4.30265273							
	P value	0.798038404							

Source: Own calculation through MS-Excel-2007

The above table shows DM of Long term debt for sample units for six years from 2014 to 2019. The highest average DM (5747.638) and second highest (4322.528) are reported by Infosys Ltd and ONGC Ltd and the lowest average DM (26.298) is reported by ITC. It indicates that in Infosys the structural changes were highest for these 6 years and then comes the ONGC where the structural changes were second highest.

Fluctuating DM with abnormal highest (25722.602) in 2015, (6113.280) in 2016, and (1663.314) in 2014 were reported by ONGC Ltd, Maruti Suzuki Ltd, and Infosys Ltd. But as we can observe that these fluctuations in DM have been reported for the time period before Ind-AS came into force, it clearly indicates that the highest structural changes that have occurred might be because of some other reasons. If we notice drastic changes in post implementation period, drastic change was found in 2018, where Infosys recorded a highest abnormal DM (32791.956), which indicates that some of the valuation practices of long term debt under Ind-AS are postponed from 2016-17.

CV reveals that the 2 companies ONGC Ltd (242.545%) and Infosys Ltd (230.799%) have reported CV above (200%), which clearly shows high variations in the component of Long term debt of these companies due to valuation practices under IND-ASs. The lowest CV (80.190%) is reported by TCS Ltd. 70% of sample units (7 companies) have been affected by the implementation of Ind-AS because significant DM is observed after 2016-17. The most affected companies are RELIANCE INDUSTRIES Ltd, TATA CONSULTANCY SERVICES Ltd, INFOSYS Ltd, ITC Ltd, LARSEN & TOUBRO Ltd, Bharti Airtel Ltd, and ASIAN PAINTS Ltd, whereas 30% (3 companies) have not been affected because no significant DM was recorded in these companies in the years after 2016-17.

However, individual Decomposition measures of sample units reported significant structural changes that took place in the component of Long term debt, but overall 't' (paired) test results show that there are no significant changes between pre and post implementation period of Ind-ASs. Here the null hypothesis (H0) is not rejected at 5% level of significance because the calculated value of t-test (0.2916) is less than the table value (4.30) and P-value (0.7980) of two-tail is greater than α of (0.05).

Table No.4No. of significant Decomposition Measures of Fixed Assets, Equities and Long Term Debts

SN	Name of Companies	Fixed Assets	Equities	Long Term Debt
1	RELIANCE INDUSTRIES LTD.	2	2	2
2	TATA CONSULTANCY SERVICES LTD	3	2	2
3	HINDUSTAN UNILEVER LTD	1	2	1
4	INFOSYS LTD.	1	1	1
5	ITC LTD.	2	1	1
6	LARSEN & TOUBRO LTD.	1	1	3
7	MARUTI SUZUKI INDIA LTD	3	2	1
8	BHARTI AIRTEL LTD.	1	2	3
9	ASIAN PAINTS LTD.	2	2	2
10	OIL AND NATURAL GAS CORPORATION LTD.	1	1	1
	Total	17	16	17
Chi Square test (Goodness Of Fit)				
	Chi-Square Value	3.5882	1.5	3.5882
	DF(N-1)	9	9	9
	Chi-Square Critical Value	16.92	16.92	16.92
	P-value	0.9363	0.9114	0.9363

Source: own calculation through MS-Excel-2007

The above table shows no. of significant DM of fixed assets, equities and long term debt components and chi-square value . It is derived from table no.1, 2 and 3. In order to test the significant difference among sample units of significant DM of various components of the balance sheet, chi-square test has been used. From the above table it is concluded that for 9 degree of freedom the calculated values of chi-square test. The calculated values of Chi-square mean ($\div 2$) are **(3.5882)**, **(1.5)** and **(3.5882)** for the component of fixed assets, equities, and long term debt respectively. The table value is (16.92). Thus, calculated values of ($\div 2$) < table value and also P-values (0.9363), (0.9114) and (0.9363) are greater than α of 0.05. So, the null hypothesis (**H₀**) is not rejected. It clearly shows all sample units have equally no. of significant DM of various Components. The visible differences can be due to the sampling unit's fluctuation or by chance.

It is found that out of 60 DM, 17 times (28.33%) it was Fixed Assets' significant DM, 16 times (26.67%) it was of Equities' and 17 times (28.33%) it was of Long Term Debts'. The highest no. of significant DM (3) was reported by TCS and Maruti Suzuki India Ltd for components of fixed assets.

The L & T and Bharti Airtel also reported highest frequency (3) for components of long term debts and for components of Equity, highest no. of significant DM (2) was reported by 6 companies.

Many companies showed only single significant DM for various components. There are 6 companies showing single significant DM for fixed Assets, 4 companies showing single significant DM for equities and 5 companies showing single significant DM for long term debts.

Table No.5 Year wise No. of companies having significant Decomposition Measures

Years	Fixed Assets	Equities	LT debt
2014	1	5	2
2015	4	1	3
2016	3	3	4
2017	3	4	4
2018	3	1	2
2019	3	2	2
Total	17	16	17
Chi-Square test (Goodness Of Fit)			
Chi-Square Value	1.7079	5.0126	1.7079
DF(N-1)	5	5	5
Chi –Square Critical Value	11.07	11.07	11.07
P- value	0.8879	0.4143	0.8879

Source: own calculation through MS-Excel-2007

The above table shows year wise number of companies having significant DM of fixed assets, equities and long term debts. It is derived from the table no. 1, 2 and 3. To test the significant differences present among the significant DMs of selected units, chi-square test is applied. From the above table it is concluded that for 5 degree of freedom the calculated values of chi-square test. The calculated values of Chi-square mean (χ^2) are (1.7079), (5.0126) and (1.7079) for the component of fixed assets, equities, and long term debt respectively. The table value is (11.07). Thus, calculated values of (χ^2) < table value and also P-values (0.8879), (0.4143) and (0.8879) are greater than α of 0.05. So, the null hypothesis (**H0**) is not rejected. It clearly shows that every year sample units have equal no. of significant DM of various components. The visible differences can be due to sampling unit's fluctuation or by chance.

From the above table, it is also revealed that the maximum number of companies (9) have significant decomposition measures after 2016 out of total (17) significant decomposition measures of fixed assets component. It has covered approx. (52.94%) of total no. of significant DM. It clearly shows that structural changes have been found in the fixed assets component after the implementation of IND-ASs. Similarly,

in Equities, (7) companies have significant DM out of total (16) significant DM after 2016 which is approx. (43.75%) of total no. of significant DM and in Long Term Debt, (8) companies have significant DM out of total (18) significant DM after 2016 which is approx. (47.05%) of the total frequency of significant decomposition. Thus, it can be noticed that the impact of implementation of Ind-AS is highest in Fixed Assets and lowest in Equities.

A comparison of components of fixed assets, equities and long term debt was made and it was found that the most affected component in the balance sheet is Fixed Assets which holds highest DM (52.94%) whereas, second highest DM (47.05%) is held by long term debts and the least affected factor is Equities which hold (43.75%) of total no. of significant DM.

Findings

- Out of 10 companies, 8 companies' Fixed Asset components (80% of sample units) were most affected by the implication of IndAS because significant DM have been observed after 2016. It means after implementation of IND-ASs, 80% of sample units have made significant changes in valuation and measurement practices of fixed assets.
- Out of 10 companies, 7 companies' (70% of sample units) Equity Components and Long Term Debts were most affected because significant DM have been observed in them after 2016. It means after implementation of IND-ASs, 70% of sample units have made significant changes in valuation and measurement practices of fixed equities and long term debts.
- Out of total 60 DM, 17 Significant DM (28.33%) were of Fixed Assets, 16 significant DM (26.67%) were of Equities and 17 (28.33%) significant DM were of Long Term Debts. As it can be noticed that these three components hold a small proportion out total significant DM which means that overall there were no major structural changes that took place in these components after the implementation of Ind-ASs.
- In Fixed Asset Components, 9 significant decomposition measures were found after 2016 out of total 17 significant DM which is approx. (52.94%) of total significant DM. Hence, it can be said that due to the implementation of IND-ASs major structural changes were identified in components of fixed assets.
- In Equities, 7 significant decomposition measures were found after 2016 out of total 16 significant DM which is approx. (43.75%) of total significant DM. Thus, this shows that after implementation of IND-ASs less structural changes were identified in components of equities.
- In Long Term Debts, 7 significant decomposition measures were found after 2016 out of total 17 significant DM which is approx. (47.05%) of total significant DM. This shows that after implementation of Ind-ASs less structural changes were identified in components of long term debts.

Conclusion

This study examines the components of fixed assets, Equities and Long term debts of selected sample units listed in BSE. The period of six years has been undertaken that is from 2013-14 to 2018-19

which covers both pre and post implementation period of IND-ASs. It was concluded from the present study that in the period from 2016-2018, most of the sample units were affected by the implementation of IND-ASs. Decomposition Measure technique has been used to study the structural changes in the selected components. The individual decomposition measures of sample units reported significant structural changes in the components of fixed assets, equities and long term debts but overall t-test results show that there are no significant changes between pre and post implementation period of IND-ASs. Through chi-square result, it was found that overall all sample units have equal no. of significant DM of various components which means that no major changes took place in significant DM among sample units and it is evident that every year (Pre and Post implementation period of IND-ASs) sample units have equal no. of significant DM of various Components. It means that no major impact was found among sample units in the pre and post period of IND-AS implementation. The present study shall contribute to corporate sectors in making various decision like investing and financing decisions and in determining the value of firm. In all these decisions, fixed assets, equity and long-term debt components play a vital role. So, the structure of these components has been analyzed systematically by applying Decomposition measure. After the application of Ind-ASs, the accounting of these components has been affected to a great extent. So, the present study will help the corporate sectors in making more efficient financial decisions in future.

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Anchor Investment and IPO Returns in India

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ABSTRACT

Initial positive returns (under pricing) of IPOs have been researched extensively throughout the world including in Indian context. There was a hot issue market from 2005-06 to 2007-08. However, situation changed in 2008, when a major crash witnessed by Indian stock market. This crash had a negative effect on the IPO market. To ensure efficiency as well as to boost the confidence of investors in IPOs, SEBI introduced the concept of Anchor investor in 2009. This measure was introduced to bring price stability to the issue and expected to improve price discovery during IPOs, as there is a lock-in period of 30 days during which the Anchor investors cannot sell off their allotted shares. This study, therefore, using the data for 207 IPOs, issued between July 28, 2009 and December 31, 2017, listed in NSE, attempts to find the effect of anchor investors on IPOs returns. Study found that presence of Anchor investors has no influence on the price of share on listing date, however after one year from listing there was significant influencing on price performance of IPOs.

Keywords: *Initial Public Offer, Under pricing, Anchor Investor*

Introduction

Stock market consists of two segments, (a) the primary market for newly created securities and (b) the secondary market where existing stocks are traded. The primary market has also shown the tremendous improvement in recent years along with the developments in the secondary market. The primary market deals with two types of issue, namely the Initial Public Offering (IPO) and the Follow-on Public Offering (FPO). An Initial Public Offering (IPO) offer securities for the first time to the public. Among the ways of raising capital from the public via, primary market, the process of initial public offering (IPO) is one of the well-known and important. Initial Public offering (IPO) is the process through which an unlisted company can be listed for the first time to a stock exchange by offering its securities to the public. Mayur and Kumar (2006) investigated statistically significant relationship between financial needs of a company and IPOs. In various countries a number of researchers have examined that IPOs are underpriced and therefore after listing of the stock provide a high initial return on the first day of trading. Under pricing results when the shares are offered at a price which is lower than the market price of the share on the first trading day. The extent of under pricing differs amongst

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countries. In India also, especially during the period 2005-06 to 2007-08 a high initial positive return has been observed when a bull period prevailed. A large number of IPOs were issued in the primary market during this period. In the year 2008 a major crash was witnessed in the Indian stock market with the NIFTY (the NSE 50 Index) falling from its high of 6287 points on 8th January, 2008 to 2524 on 27th October, 2008 which resulted in a decline in investor confidence.

Against the backdrop, SEBI (Securities and Exchange Board of India) introduced the concept of Anchor Investment in June 2009. The main motivation behind the concept of anchor investment was to bring price stability to the issue as there is a lock-in period of 30 days during which the anchor investors cannot sell off the allotted shares. Moreover it also hopes to enhance price discovery; boost the confidence of investors in IPOs. An anchor investor is a qualified institutional buyer, who can invest up to 30 % (now enhance up to 60 %) of the Qualified institutional buyer (QIB) quota, subject to the minimum application size of each anchor investor should be Rs.10 crore. Anchor investors subscribe to shares one day before the bid is open to other investor categories. Naturally as an important and high net worth investor, an anchor is expected to do a lot of ground research about the company before making the investment. Having greater resources and better access to information as compared to retail investor, the anchor's confidence is expected to trickle down to the small investor. The moot question is whether anchor investments have really been able to full fill its purpose of bringing price stability and boosting the confidence of investors in IPO. The present study is directed to understand (a) Whether "Anchoring" is stabilizing the price post listing of IPOs & (b) Whether the under pricing still persists in the stock market in India. The paper is structured as follow: Starting with literature review, it is followed by methodology, analysis, findings and implications.

Review of Literature

Pandey (2005) investigated the difference in under pricing of IPOs caused by difference in allocation mechanism. From a sample of 84 Indian IPOs issued (20 book-builds and 64 fixed prices) from the period 1999-2000. Study found the initial returns as-well as cumulative market adjusted return were higher on fixed offer pricing. Ansari V. Ahmed (2006) studied the IPO under pricing in India during the period of 2005. The principal objective of the study was to check the persistent of IPO under pricing in India during the period of 2005. Study found that the average first-day return (under pricing) was 40.9 percent which is quite substantial. He also found that during the period 84 percent of the IPOs were underpriced and 16 percent were overpriced. Deb (2009) examined the under pricing in Indian IPOs from 2001 to 2009, using a sample of 187 IPOs. The results indicated evidence of under pricing on the average in Indian IPOs during this period.

Malpani (2013) tried to find out whether the introduction of anchor investment by SEBI actually served its purpose of boosting investor confidence and provide stability in a volatile market at various time lengths using the data of 17 IPOs issued during 2009 to 2011. Author used mean, standard deviation, independent sample t-test tools to analysis the result. Author found that the presence of anchor investment has no influence on the share price ranging from short term and long term horizon. Gupta and Jindal (2016) investigated on the effect of the introduction of anchor investors has had on the IPO return by comparing the return from the IPOs where Anchor investors were appointed vis-à-vis return of IPOs with no Anchor investors. Authors calculated absolute as well as the market adjusted excess returns on the day of listing and one month post listing data. For the purpose of comparing total 101 IPOs (From

2009 TO 2011) listed on the NSC were taken as a sample. Study found no significant difference in the average absolute initial returns and market adjusted excess return between anchor backed and non anchor backed IPOs. Authors also found that return of both categories of IPOs fall drastically after 30 days. As the concept of anchor investment is relatively new, little research studies have been carried out. Thus there is a need to determine the impact the anchor investment and understand under pricing of IPO in this context. The paper examine the anchor backed vs. Non Anchor backed IPOs and their post listing price behavior.

Methodology

Data Collection and Sample Design

The present study depends on secondary data. The secondary data is collected from prime database.com. Besides this, secondary data was also collected from nseindia.com, books, magazines, theses and reports. Study was conducted using secondary data from July 28, 2009 to December 31, 2017. The research included IPOs with equity as instruments, which were listed in National Stock Exchange. In this study authors tried to compare and analyze the price performance of the Anchor backed IPOs and Non Anchor Backed IPOs in India. Companies listed on National Stock Exchange and having a trade history of up to a period of one year were considered for analysis. Data regarding Offer Price, Listing Date, Listing Price and the prices subsequently required are available.

The instruments of issue are equity shares and S&P CNX Nifty was selected as the market index for the study (for the same period).Retail Subscription data are considered for anchor subscription. Companies who have split stock and issued bonus share within one year were not considered for study and IPOs issued through fixed price route were also not considered. During the study period, total 207 IPOs were offered to public which were listed in National Stock Exchange. Out of which 9 companies either split their shares or issued bonus share within one year of listing and 4 companies were listed through fixed price route. Remaining 122 IPOs were listed through Book building Anchor backed and 72 IPOs were listed through book building without Anchor backed. Finally total 194 sample IPOs (Anchor backed and non-Anchor Backed) issued through Book building route were considered for study.

Financial Techniques used to measure price Performance

To determine the magnitude and degree of the deviations of market price of the stock from its offer price, returns have been computed for both Anchor backed and non-Anchor backed IPOs. Positive returns on listing day indicated under pricing while negative returns on listing indicated overpricing.

Initial price performance: The initial prices performance has been calculated as the difference between the closing price on the first day trading and offer price (Anchor backed and non Anchor backed IPOs) and has been divided by the offer price. The result figure has been multiple by 100 to set the figure in percentage.

$$RRet = \frac{p_1 - p_0}{p_0} \times 100 \dots \dots (i)$$

Where, R Ret. = Raw return or initial return for stock.

P1 = Closing price on the first day of trading (on listing date).

Po = Offer price.

Further adjusted market returns have been calculated to adjust substantial change and time gap between the offering and listing of the stock. From the following formula-

$$MAER = \frac{p_1 - p_0}{p_0} - \frac{m_1 - m_0}{m_0} \times 100 \dots \dots \dots (ii)$$

Where, MAER= Market adjusted excess return.

M1= Closing value of Market Index on first trading day.

Mo= Closing value of Market Index on offer closing date.

After-Market Performance: The returns after one year from listing day have been calculated by taking closing prices of the given stocks (for both Anchor backed and non-Anchor backed IPOs) from the listing day. Following formula has been used to find out the same..

$$RRet_t = \frac{p_t - p_0}{p_0} \times 100 \dots \dots (iv)$$

Where, R Ret t. = Raw return for stock in one year after listing day

Pt=Closing price one year from listing day

Po=Closing price on listing day.

Similarly, the market adjusted excess returns are calculated for one year from listing day by using the formula:

$$MEARt. = \frac{p_t - p_0}{p_0} - \frac{m_1 - m_0}{m_0} \times 100 \dots \dots \dots (v)$$

Where, MAER = Market adjusted excess return at the end of one year

M1 = Closing value of Market Index in one year from listing day

Mo = Closing value of Market Index on listing day

Mann Whitney U test

Further, in order to check the validity of null hypothesis, researchers performed Mann Whitney U test to confirm whether price performance of both Anchor backed and non-Anchor backed IPOs period are statistically significant or not. Mann Whitney U test is a rank based non-parametric test alternative to the independent-sample t –test, which can be used to determine if there is difference between two independent groups (i.e. ,unrelated) , when data fails the assumption (non-normally distributed data) of the independent-sample t –test. As per SPSS analysis data of the study were not normally distributed. In this study, when data fulfilled the critical assumption of the Mann-Whitney U test (i.e. Distributions of the two groups of the independent variable were similarly shaped,) the researchers used a Mann-Whitney U test to figure out if there was a statistically significant median difference in price performance between both groups of IPOs, and when data failed the critical assumption, researchers used the Mann –Whitney U test to determine if there was statistically significant difference in the mean ranks of the dependent variable in terms of the two groups. Price performance

(return) is the depended variable of the study and IPO is independent variable, which is split into two groups: Anchor backed IPOs and Non Anchor Backed IPOs.

Result and discussion

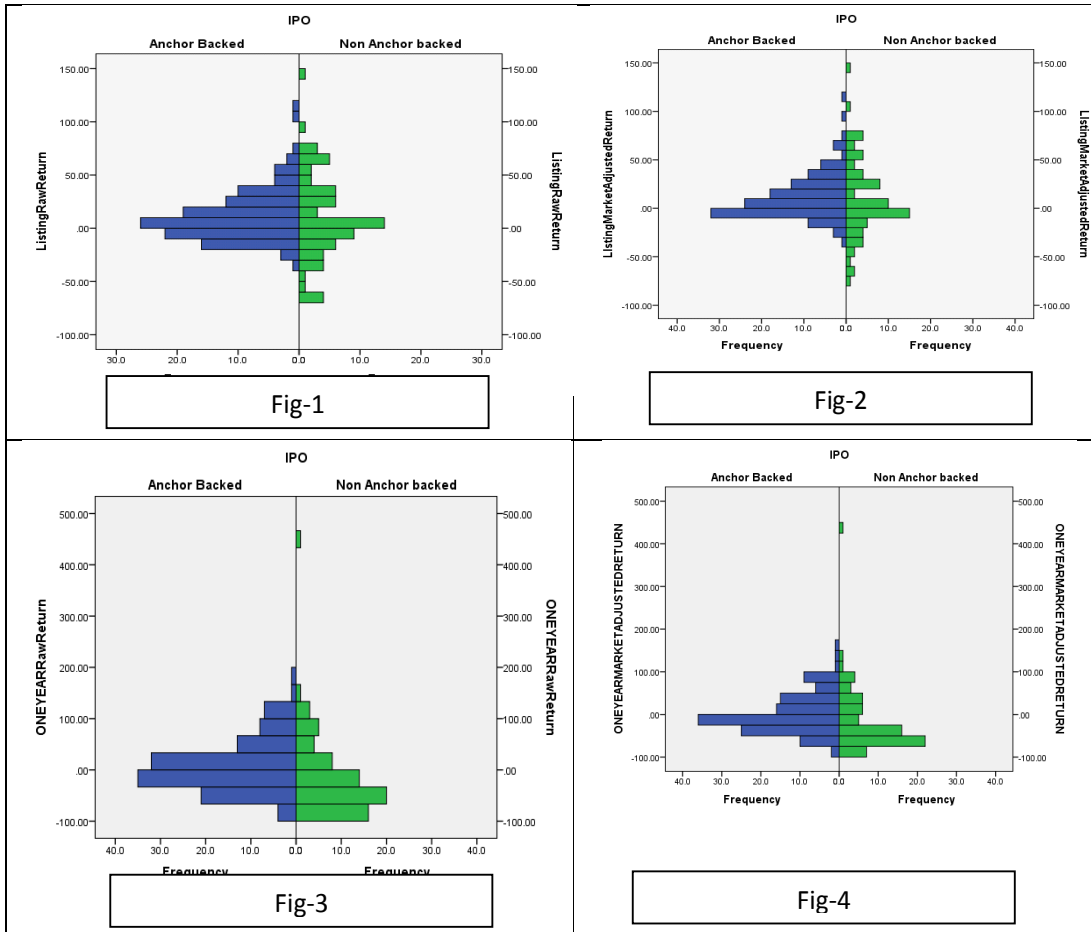
Price Performance of IPOs on Listing Date and one year after listing day.

Table 1: Mean, Standard Deviation & Standard Error of Anchor Backed and Non Anchor Backed Investors Stocks on listing date and one year after listing day. (Figures are in percentage)

	Group Statistics				
	Anchor Investors /Non Anchor Investors	Number of IPOs	Mean	Standard Deviations	Standard Error
Raw Return on listing Date	1.00	122	11.6126	24.4427	2.2129
	2.00	72	9.9617	39.7633	4.6861
Marked Adjusted Return on listing date	1.00	122	11.6631	24.1815	2.1892
	2.00	72	9.0982	39.8374	4.69489
Return in 1 year (Raw Return)	1.00	122	8.9736	50.8971	4.6080
	2.00	72	-12.1831	79.4290	9.36081
Return in 1 year (Marked Adjusted Return)	1.00	122	1.7374	47.1930	4.2726
	2.00	72	-14.5142	77.2339	9.1021
In the table 1, 1=IPOs with Anchor Investors, 2 =IPOs without Anchor Investors.					
Source: from www.primedatabase.com and www.nseindia.com and analyzed using SPSS.					

As evident from the table 1 it is seen that, the IPOs with Anchor investor shown an average absolute initial return of 11.6126 percent (with standard deviation of 24.4427 percent), while IPOs without Anchor investors provide a little lower average absolute initial return of 9.9617 percent (with standard deviation of 39.7633 percent). Similarly it is also seen that average market adjusted return of 11.6631 percent (with standard deviation of 24.1815 percent) of IPOs with Anchor investors brought little higher return than average market adjusted return of 9.0982 percent (with standard deviation of 39.8374 Percent) of IPOs without Anchor investors. Analysis also revealed that after one year of listing although returns from Anchor Backed IPOs underperformed bit but still remained positive for both average raw return of 8.9736 percent (with standard deviation of 50.8971 percent) and average market adjusted return of 1.7374 percent (with standard deviation of 47.1930 percent). However returns from Non Anchor Backed IPOs came out negative for both average raw return of -12.1831 percent (With standard deviation of 79.4290 percent) and average market adjusted return of -14.5142 percent (with standard deviation of 77.2339 percent)

Evaluation of the distribution return scores of anchor backed and non-anchor IPOs on listing date and one year after listing day using SPSS statistics:



By looking at these pyramids above in Figure -1 & Figure -2, authors made judgment about distribution of scores of IPO return scores, which are not fairly similar shape in both cases (, i.e., Raw returns and market Adjusted Returns).So, Mann Whitney U-test was used to determine whether there is difference in the distribution of two groups. However, as assessed by visual inspection of the above pyramids in Figure- 3 and Figure -4, authors made judgment that distribution of the return scores for Anchor backed IPOs and non-Anchor backed IPOs were similar. (, i.e., in both raw returns and market Adjusted Returns).So here as well, Mann Whitney U-test was used to test to determine whether there are differences in the medians of Anchor backed IPOs and Non Anchor backed IPOs in one year after listing.

Mann-Whitney Test

Ranks

	IPO	N	Mean Rank	Sum of Ranks	Median
Raw Returns on Date of Listing	Anchor Backed IPOs	122	99.18	12099.50	6.4250
	Non Anchor backed IPOs	72	94.66	6815.50	2.8100
	Total	194			4.7850
Market adjusted Returns on day of Listing	Anchor Backed IPOs	122	100.47	12257.00	6.2450
	Non Anchor backed IPOs	72	92.47	6658.00	1.8050
	Total	194			4.2000
Returns in one year after listing (Raw Return)	Anchor Backed IPOs	122	109.50	13358.50	1.0400
	Non Anchor backed IPOs	72	77.17	5556.50	-32.9300
	Total	194			-8.6500
Returns in one year after listing (Marked Adjusted Return)	Anchor Backed IPOs	122	108.84	13279.00	-8.8900
	Non Anchor backed IPOs	72	78.28	5636.00	-32.7900
	Total	194			-15.7450

Source: from www.primedatabase.com and www.nseindia.com and analyzed using SPSS.

Test Statistics

	Raw Return on Listing day	Market Adjusted Return on Listing date	Raw Return in one year after listing day	Market Adjusted Return in one year after listing day
Mann-Whitney U	4187.500	4030.000	2928.500	3008.000
Wilcoxon W	6815.500	6658.000	5556.500	5636.000
Z	-.541	-.958	-3.874	-3.663
Asymp. Sig. (2-tailed)	.588	.338	.000	.000

Grouping Variable: IPO

Significance level is 0.05

Comparison and Analysis (raw and market adjusted) returns scores between Anchor Backed IPOs and non-Anchor backed IPOs on listing day and one year after listing day:

Since the shapes of distribution of listing day raw return scores for two groups of IPOs were not similar as seen in the above pyramid (figure-1). In case of listing day raw returns comparison, study concluded that return scores for Anchor Backed IPOs (mean rank =99.18) and return scores for Non Anchor backed IPOs (mean rank=94.66) were not statistically significantly different, $U=4187.500$, $Z=-.541$, $p=.588$ (>0.05). Asymp. Sig., (2-tailed). Similarly, shapes of distribution of listing day market adjusted return scores for two groups were also not similar as seen in the above pyramid (figure-2). In case of marked adjusted listing day returns comparison also, authors concluded that return scores for Anchor Backed IPOs (mean rank =100.47) and return scores for Non Anchor backed IPOs (mean rank=92.47) were not statistically significantly different, $U=4030.000$, $Z=-.958$, $p=.338$ (>0.05). Asymp. Sig., (2-tailed). However, Raw returns and market adjusted returns of both groups of IPOs showed positive returns on the day of listing which indicates that the investors who purchased shares on the offer date earned higher returns from holding the shares of the IPOs on the first day of trading of the shares and there still exist under pricing on the date of listing after introduction of anchor investors. Further by inspecting visually (figure -3) it is seen that, distributions of the raw return scores of one year after listing were found similar and median return scores for Anchor backed IPOs (1.0400) and median return scores for non anchor backed IPOs (-32.9300) was statistically significantly different, $U=2928.500$, $Z=-3.874$, $p<.0005$. Similarly, Distributions of the market adjusted return scores of one year after listing for both the groups were found similar as assessed by visual inspection in (figure-) 4 and median market adjusted return scores for Anchor backed IPOs (-8.8900) and median market adjusted return scores for non anchor backed IPOs (-32.7900) was also statistically significantly different, $U=3008.000$, $Z=-3.663$, $p<.0005$.

Conclusions and Recommendations

The entire research intended to investigate the impact of Anchor investor on IPOs price performance at various time periods. Study found that presence of Anchor investors has no influence on the price of share on listing date. However one year after listing day there was a significant influencing on price performance. Authors also examined that raw return and market adjusted return of both groups showed positive returns on the day of listing, which indicated that the investors who purchased shares on the offer date earned good returns from holding the shares of the IPOs on the first day of trading and their still exist under pricing of share. So, study concluded that analyzing the results using Mann Whitney-U test, researchers found some significant impact of anchor investors on IPOs price performance one year after listing day. Therefore, study concluded that recent change brought by SEBI (Introduction of concept Anchor investor in primary capital market) is welcoming decision for both investors and the company. Study further suggests that more research with extended empirical evidence is required to substantiate the conclusion given in the study.

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Analysis of Problems and Prospects of Handicraft Artisans in the State of Goa- Case Study

Dr. Juao Costa & Priyanka Da Silva

ABSTRACT

The study “Analysis of problems and prospects of handicraft artisans in the State of Goa” was undertaken to check the issues featured by handicraft artisans in Goa and to gauge the expansion of handicraft business over the past five years. Hypothesis set was, Ho: there’s no important relationship between the expansion of handicraft business with sales turnover, financial gain generated, profits re-invested, assets purchased, wealth generated, new units established, exports accomplished. on doing multivariate analysis alternate hypothesis was chosen. So as to run correlational analysis eighteen factors were taken and were reduced right down to eight major elements. The sample elite for the aim of study was a hundred. From the study it was concluded that, as the academic qualification increases the attention concerning varied schemes conjointly increased. It was also found that the artisans face issues in availing the facilities from the government and also that government has not taken any major steps for commercialization of the handicraft product.

Keywords: *Handicrafts, Artisans, Problems, Growth*

Introduction

Handicraft industry provides job for giant number of artisans in whole country, both male and feminine are engaged in this sector. It is really a tool to eradicate the unemployment in rural economy and become the source for economic development both in rural as well as urban areas. Handicraft industry plays an important role in the growth and development in the rural areas, because after agriculture handicraft is the primary work of the rural population to earn their livelihood. The focus of Indian exports still continues to be on goods manufactured by urban industries like engineering goods, textiles, gems and jewelry etc. Though there is great emphasis for export from small and medium scale industries, the thrust given for viable and profitable areas like Handicrafts is much less, than what it should have been. Handicrafts in this country form an important part of our rich cultural heritage. Handicrafts have now got partially submerged under the rising forces of modern industrialization with its higher mechanization. The industry is considered to be important to Indian economy and is taken into account because the second largest employment generating sector after agriculture, i.e., around 6 million

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artisans are related to the industry who are basically from the weaker sections of the society and is one among major exchange earners for the country. Rising cost of raw materials and inflation are big threats to the Indian handicraft industry. Obsolete technology is one other major reason for India's low share within the world handicraft market.

Literature Review

Few retailers face constraints associate degreeed challenges whereas commercialism their product respondents additionally report that there had been an inflated use of handicraft product. Therefore, it's going to be aforesaid that retailers square measure happy from their profession and like to be during this profession in spite of varied challenges (Khurana 2011). The export of handicrafts in Thanka is in rising trend. it's additionally illustrious that the entire Export of Handicraft and Thanka export have moderate degree of direct correlation (Pandey 2011). Despite efforts being taken, problems like lack of implementation of policies and concentration on the macro perspective have ceased the effectiveness of the efforts, giving very little or no results. Post the review of the present state of the Indian artisans, there arises a requirement for honing the abilities of this hands (Jadhav 2014). it absolutely was noticed that majority of the social group girl artisans square measure having the autonomy to sell their product. Whereas among non-tribal girl artisan's majority fifty-one % of the respondents don't have the autonomy to sell their product at their own decisions (Laxmi 2014). The study was undertaken to search out challenges and threats featured by craftsman of geographic area alongside their strengths and future opportunities. West Bengal is extremely reach in handicrafts attributable to its long heritage and culture. Since decades, an oversized range migration befell in geographic area that created the state a culturally diversified. Artisans from numerous components of the state square measure engaged in making their own quality product. From the study it absolutely was found that a lot of travelers visit West Bengal attributable to the provision of type of handicrafts within the state (Mukherjee et al 2016). four-hundredth of the respondent's aforesaid financial gain from the handicraft's profession is low. 15% aforesaid that there's no encouragement from the government. Another 15% aforesaid stuff shortage is additional. 15% aforesaid that lack of encouragement from public is another excuse. different reasons such lack of necessary market info machine created product square measure obtainable within the market, handicrafts square measure purchased solely by made folks etc. (Raju 2016). The challenges of lack of experienced staff and fleeing of experienced staff and Challenges like lack of innovation and method improvement, the issues mentioned within the study were like worth fluctuations, worth fixation and worth standardization within the trade (Neha et al 2017). the "Free-Mentality" of individuals is that the main hurdle for development that boosts the inactivity, demotivates exhausting staff and makes them incapacitated. it's been ascertained throughout the analysis work that there's associate degree surroundings of distrust, misconceptions and delusions among rural artisans relating to the behavior of government/ banking establishments and execution of programs. Hence, they appear petrified of being cheated, exploited or become victim of felony. This mentality pulls them resolute take edges of presidency schemes and help programs (Shah Amisha 2016). The ever-increasing growth in terms useful of export indicates the high potential of property of this trade in coming back future. This trade includes a capability to use the millions of rural laid-off artisans and becomes the simplest instrument of removing the regional inequality from the country (Bano 2016). Lack of agreement in shaping and classifying handicrafts, non-availability of comfortable information, industrialization, production, unwilling young generation,

lack of basic infrastructure, lack of innovation and technology and educational/training facilities and restricted money resources. These problems square measure deteriorating the importance of the craft heritage (Shafi et al 2018).

Research Gap

The review conducted for the purpose revealed that the handicraft sector in Goa is in its infancy stage. The state of Goa was ruled by the Portuguese who left behind its legacy-Political, Economic, Financial and cultural. Though lots could have been done for the promotion of handicrafts in Goa being a tourist state, little attention is given by the various stake holders . Not much studies have been conducted on this topic. The present study made an attempt to identify the problems faced by artisans and its prospect in Goa.

Objectives

The major objectives of the study are to find out the problems faced by handicraft artisans in the State of Goa and to evaluate the growth in handicraft business of selected artisans in Goa over the past 5 years.

Research Methodology

The required data for the proposed study is collected from primary and secondary sources. The primary data was collected by preparing and administering an open and closed-ended questionnaire to various artisans, in the State of Goa. The present study also relies on secondary data sources like, various books and journals, magazines, newspapers were referred and also information from the internet was obtained. The period of the survey is considered as the period of study that is the year 2019-2020.

For the purpose of analysis 18 factors were identified which measures the problems faced by handicraft artisans in the State of Goa. Regression analysis was used in order to measure the variables having significant relationship with growth of business over the past 5 years. Frequency Distribution of respondents is shown based on gender and age and Cross Tabulation was used to check the education with level of awareness and gender with level of awareness about the schemes.

Analysis of the Study

The information collected was analyzed as under using, Frequency distribution, cross tabulation, factor analysis and regression analysis.

Demographic Profile of the Respondents:

This study is done with the help responses provided by 100 respondents, out of which 71 are male and 29 are female. Further classification is done based on the age of the respondents of which below 20 are 2, 20 to 30 are 32, 30 to 40 are 37 and 40 to 60 are 18 and above 60 are 9.

Table No: 1. Cross Tabulation Between Educational Qualification and awareness about the Scheme

		Awareness about the Scheme		Total
		No	Yes	
Educational Qualification	SSC	9	27	36
	HSSC	7	19	26
	Graduate	6	21	27
	Others	5	6	11
Total		27	73	100

Source: Compiled from Primary data

Table No: 2. Crosstabulation Between Gender *Awareness About the Scheme

		Awareness about the Scheme		Total
		No	Yes	
Gender	Male	23	48	71
	Female	4	25	29
Total		27	73	100

Source: Compiled from Primary data

Table No: 3. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.588	
Bartlett's Test of Sphericity	Approx. Chi-Square	336.044
	Df	190
	Sig.	.000

Source: Compiled from Primary data

KMO and Bartlett's Test is one of the prime tests required for any analysis. This test shows that the data is significant and it is proved when the value obtained as .000.

From the above table it is observed that the value of sample adequacy test is 0.588 which is quite good to be acceptable for the factor analysis to be done. This is further proved by the significance level at 5 percent which shows a value of 0.000.

For the purpose of factor analysis, a rotated component matrix has been constructed where varimax method of rotation with Kaiser Normalization have been chosen and principle component analysis has been considered as an extraction method. Relations have been converged in 25 iterations. The output of factor analysis provides 8 most prominent factors from 18 items provided as the base. The following table shows the factor analysis done on 18 items.

Table No: 4. Rotated Component Matrix

	Component							
	1	2	3	4	5	6	7	8
Unable to produce items on time due to financial difficulty	0.73							
Attitude of locale is not encouraging	0.656							
Facilities provided by government are not sufficient	0.633							
Face difficulty in availing the subsidy on time.	0.586							
Location of demonstration centre's and fairs are not conducted properly.		0.78						
Contact program of artisans is not available		0.633						
Promptness in services to supply in time is not possible to lack of raw material		0.549						
There is no physical infrastructure			0.741					
Material is costly, so couldn't afford without subsidy			0.632					
There is insufficiency of incentives for export				0.686				
Proper steps are not taken by the government in promoting handicrafts				0.593				
No artisan friendly schemes by NGOs/Cooperatives					0.79			
Government does not have artisan friendly schemes					0.695			
Ability of workers for work is decreasing due to lower wages						0.77		

Trainings facility for up gradation of skills are not conducted						0.623		
No help is rendered by agencies in exporting handicrafts							0.826	
Insufficiency of outlets to sell the items							0.575	
Proper and good quality supply of raw materials is not available								0.882

Source : Primary Data

Interpretation of Factor Analysis Results: Factor Analysis has reduced the dimension of the 18 factors into 8 major components. These 8 components are renamed and explained as Hurdles in availing benefits: Factors coming under this are, unable to produce items on time due to financial difficulty, attitude of locale is not encouraging, facilities provided by government are not sufficient and face difficulty in availing the subsidy on time. Problems in supply: the sub factors are location of demonstration centers and fairs are not conducted properly, contact program of artisans to contact amongst each other for any help is not available and promptness in services to supply in time is not possible to lack of raw material. Infrastructural and financial difficulties: The two factors are, there is no physical infrastructure and material is costly, so couldn't afford without subsidy. No correct incentives: The 2 factors square measure, there's insufficiency of incentives for export and correct steps aren't taken by the government in promoting handicrafts. Problems in availing the schemes: Factors clubbed underneath this square measure, no friendly schemes by NGOs/Cooperatives and government doesn't have friendly schemes. Lack of coaching and wages: Ability of employees for work is decreasing because of lower wages and trainings facility for up gradation of skills aren't conducted. Constraints in selling: No assistance is rendered by agencies in commercialism handicrafts and Insufficiency of retailers to sell the things. Raw material problems: Proper and good quality supply of raw materials is not available.

Statement of Hypothesis for the purpose of Regression Analysis

A hypothesis is an unproved statement or proposition a few issue or development that's of interest to the investigator. The variable in regression is taken into account to be growth of handicraft business whereas seven different freelance variables were set. the subsequent hypotheses were generated to be verified with applied math analysis.

H₀: There is no significant relationship between the expansion of handicraft business with sales turnover, income generated, profits re-invested, assets purchased, wealth generated, new units established, exports accomplished.

H₁: There is a significant relationship between the expansion of handicraft business with Sales turnover, income generated, profits re-invested, assets purchased, wealth generated, new units established, exports accomplished.

Table No. 5 Reliability Statistics

Cronbach's Alpha	N of Items
.790	7

Source: Compiled from Primary data

Table No. 6 ANOVAa

Table No. 6 ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	86.364	7	12.338	5.615	.000 ^b
	Residual	202.146	92	2.197		
	Total	288.510	99			

Source: Compiled from Primary data

Table No. 7 Coefficientsa

Test: H ₁					
Dependent Variable: Growth of handicraft business in Goa					
R Square: 0.299					
Decision: Accept the alternate hypothesis					
Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	2.392	.907		2.637	.010
Sales turnover	-.029	.167	-.026	-.172	.864
Income Generated	.355	.153	.332	2.314	.023
Profits reinvested	.140	.138	.134	1.019	.311
Assets purchased	-.041	.126	-.039	-.326	.745
Wealth generated	.202	.103	.218	1.955	.044
New units established	.311	.250	.112	1.242	.217
Export started and accomplished	.008	.299	.002	.027	.979

Source: Compiled from Primary data

The table shows the results of multivariate analysis, that shows the relationship between dependent and freelance variables. In the table, the freelance variables square measure sales turnover, financial gain generated, profits re-invested, assets purchased, wealth generated, new units established and exports accomplished square measure measured against variable i.e. growth of business. .The R square is 0.299 which means that the model is explained to the extent of 29%. Apart from these factors there may be a number of other factors which have relationship with the growth of handicraft business. The model has been found significant at five-hitter level of significance. Income generated and wealth generated contributes towards dependent variable by 0.023 and 0.044 significance level respectively, which is below 0.05. However, the sales turnover, profits re-invested, assets purchased, new units established and exports started are found to be insignificant as they have significance of 0.864, 0.311, 0.217 and 0.979 respectively.

Equation of the above table will be as follows:

$$Y = \hat{a} + \hat{a}_1 X_1 + \hat{a}_2 X_2 + \hat{a}_3 + \hat{a}_4 X_4 + i$$

$$\text{Growth of handicraft business} = 0.010 + (0.023) \text{ income generated} + (0.044) \text{ wealth generated} + i$$

Conclusion

From the current study, it is found that there's tons potential for top quality and unambiguously designed handicraft product in province the study revealed that most of the male artisan's square measure aware of the schemes then the feminine artisans that square measure provided by government. It was seen that, because the academic qualification will increase the attention concerning varied schemes conjointly increase. From the study it is ended that the artisans face issues in availing the facilities from the govt. From the study it may be understood that government has not taken any steps for commercialization of the handicraft product. It was conjointly found that artisans every now and then face monetary constraints in shopping for the material needed for creating the handicrafts.

It is suggested to facilitate the infrastructure of handicraft business, correct help within the promotion and correct monetary help to province exports for the quantitative and qualitative improvement of Goa handicraft business is needed. It is also recommended that the promotional activities like trade shows, exhibitions and Handicraft product exposition ought to be organized at district similarly as at city level to draw in foreign and domestic customers towards Goan handicraft product. The welfare organizations ought to take additional initiative to create the artisans aware of the varied welfare schemes and to produce facilitate in taking the advantage of those schemes for his or her individual growth and development. The artisans ought to be trained to create use of latest tools and equipment's within the producing of all handicraft things fabricated from wood, brass and shells so as to extend the productivity. The government ought to give capital to modernize the craft and also organise awareness programmes to produce all the data associated with selling, cost accounting and different supply like raw materials and monetary assistances and coaching as well. More social group girls ought to be inspired to enter into handicraft sector which is able to modify their self-employment programs of presidency.

Scope for further study

A Study can be undertaken to evaluate the socio-economic upliftment of artisans due to handicraft business and also study can be undertaken in consumer point of view, about their experience or perception with regards to handicraft products.

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A Study on Music Listening Behaviour and Preference for Music Streaming app among Youths.

Nishita Soumya & Dr. Supriyo Patra

ABSTRACT

The appeal of music is universal in nature and Globalization and digitization of music has also led to change consumer behaviour towards music listening. The objectives of the study are to understand music listening behaviour, effect of mood on music preference and the most preferred music streaming App among respondents of different demographic profiles in Kolkata. Cross sectional research design was used and Primary data was collected from 154 respondents comprising of male and female respondents aged 16-30 from Kolkata with the help of a structured questionnaire. Independent samples t-test and ANOVA were conducted with SPSS. The contribution of the present study relates to the fact that Music Streaming apps are the most preferred medium of listening to music. Spotify is the most preferred music streaming app. There exist significant differences between time spent listening to music between males and females and both the genders are equally driven by mood when it comes to deciding what music to listen to. There is a significant difference between income and the willingness to pay for music streaming apps. This will have an implication for various music streaming App brands in this industry in understanding the behaviour of their target audience better while framing their marketing strategy.

Keywords: *Consumer Behaviour, Music listening, Demographic profile & Kolkata.*

Introduction

Music is omnipresent. For most people, life without music is impossible to imagine. Not only that, music has become a full-fledged industry which contributes significantly to the economy all over the world.

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Emergence of Music streaming Apps

The musical landscape has changed a lot in the last few decades. People no longer have their music collection on show on shelves. In fact, 'music' doesn't even have a physical existence anymore. Music is thus more portable and accessible now. The most recent form of digitised music is "streamed music" which is now made available through music streaming apps. Most (if not all) of these music streaming apps have premium/paid versions that offer benefits like unlimited skips, ad-free content, offline listening and much more.

Music streaming has become a highly competitive industry worldwide in recent times. In India too, there are a plethora of players in this market. Some of these are Spotify, JioSaavn, Gaana, Wynk, Apple Music, Amazon Music, YouTube Music

Digitisation and Music listening

The effect of digitisation is much more on the youth, who grew up with the changing technologies. It is also the youth who can throw light on the future of this industry. Thus, this research has been targeted towards youth in the age group of 16-30.

It is necessary to understand music listening habits and preference of consumers in order for this industry to grow further. That is one aspect that this research will focus on- understanding music related behaviour and also the possible factors affecting them.

Literature Review

There is extensive research on various music related topics all around the world. Groarke & Hogan(2019) stated in their paper "that self-chosen music leads to reduction in negative affect for both younger people and elder people". Dileo, Mitsudom & Lee (2014) did a meta-analysis of long term benefits of music listening. The findings of their study indicated that "while physiological, psychological and behavioural effects were not significant, social and cognitive effects are significant". Yang & Liu (2013) focused their research on "music listening behaviour qualitatively in an affective and social sense and identified strong association between user mood and music emotion. In another piece of research, Duner, Ruyter & Bouwhis (2016) "assessed correlation between personality types and music preferences. Spinelli(2015) studied "the music listening habits of undergraduate students of University of Vermont". Respondents gave their views about "their favourite genres and bands, concert attendance, downloading habits, most common mediums of listening to music, and music streaming services". Carver (2016) focused the study specifically on "Spotify and its impacts on the music industry. It was concluded that while Spotify doesn't directly increase artists' revenues, it reduces online piracy of music and also increases the reach of artists' music quite significantly". According to Kuyucu.(2015) "the effects of Media on the music listening habits of University students in Turkey" compared the relevance of traditional media and the Internet in the current music industry.

Research Gap

From review of existing literature, it was evident that various studies were conducted across the globe focusing on personality and preference for music, online piracy aspect, mood and music listenership on a qualitative level and impact of music on overcoming negative emotions. Literature review revealed that research work on music listening behaviour hasn't been as extensive in India as it has been in other

parts of the world. Moreover, there is not much research that happened focusing on music listening behaviour in Kolkata. This motivated us to undertake the present study among youths of Kolkata. Gender wise or age wise comparisons of average time spent listening to music have not yet been done as per our review of existing literature which is identified as a GAP that we tried to address. Moreover, music listening behaviour, effect of mood on music preference, willingness to pay for music streaming Apps and the most preferred music streaming App among respondents of different demographic profiles in Kolkata are also identified as research Gap that we have tried to address in our present study.

Significance of the Study

Music streaming has become a highly competitive industry worldwide in recent times. In India too, there are a plethora of players in this market. Some of these are Spotify, JioSaavn, Gaana, Wynk, Apple Music, Amazon Music, and YouTube Music. With so many options available, it becomes significant to study consumer's music listening behaviour and preferences regarding music streaming apps.

Research Objectives

The **objective** of the study is to understand music listening behaviour, effect of mood on music preference, willingness to pay for music streaming apps among different income groups and the most preferred music streaming App among respondents of different demographic profiles in Kolkata.

Hypotheses of the Study

1. H_{01} : There is no significant difference in terms of time spent on listening to music among males and females.
2. H_{02} : There is no significant difference in terms of time spent listening to music among respondents of different age groups.
3. H_{03} : There is no statistically significant difference on the effect of mood on music preference between males and females.
4. H_{04} : There is no statistically significant difference between willingness to pay for music streaming apps among different income groups.
5. H_{05} : There is a positive correlation between income and willingness to pay for music streaming services.

Research Methodology

The research design is descriptive and non-probability technique of Convenience Sampling has been used for choosing the respondents. The sample size was 154. The respondents were based in Kolkata. The study was conducted between March 2020 and April 2020. Primary data has been used for the purpose of this research. An Online Questionnaire, created on Google Forms was circulated among the people in the age group of 16-30 who reside in Kolkata to collect the data. The questionnaire contained questions regarding demographic profiles like age, gender and monthly household income. SPSS was used to conduct the tests of One-way ANOVA, independent samples t-test and Spearman correlation.

Data Analysis and Interpretation

Demographic Profile of Respondents

Table 1: Demographic information of the respondents. The total number of respondents who took part in the survey was 154.

	No. Of Respondents	% of Respondents(Approx.)
GENDER		
Male	82	53
Female	72	47
AGE		
16-18	16	10
19-25	116	75
26-30	22	15
MONTHLY HOUSEHOLD INCOME(In Rs.)		
< 50,000	29	19
50,001-100000	53	34
100001-150000	31	20
150001-200000	15	10
> 200000	26	17

The average time spent listening to music of all 154 respondents was found to be 2.56 hours.

Effect of gender on time spent listening to music

H₀₁: There is no significant difference in terms of time spent listening to music among males and females.

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Time	M	82	1.726	1.5054	.1662
	F	72	2.514	2.3073	.2719

		Levene's test for Equality of Variances					t-test for Equality of means		95% Confidence Interval of Difference	
		F	Sig.	t	df	Sig(2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Time	Equal variances assumed	14.691	.000	-2.539	1.52	.012	-.7883	.3104	-1.4016	-1.750
	Equal variances not assumed			-2.473	119.378	.015	-.7883	.3187	-1.4193	-.1572

The group statistics table in the output above shows that the average time spent on listening for males is 1.726 hours while that for females is 2.514 hours.

For the independent samples test, we looked at the row of “equal variances not assumed”. The column labelled ‘t’ gave the t-value for the t-test which is 2.473 in this case. Further, the significance was found to be 0.015. As this value is less than 0.05, the **null hypothesis gets rejected**.

Thus, at-test revealed a statistically reliable difference in mean time spent listening to music for males (M = 1.726, s = 1.5054) and for females (M = 2.514, s = 2.3073), $t(119.378) = 2.473, p = .015, \alpha = .05$.

Based on the findings we can state that **there is a significant difference in terms of time spent listening to music among males and female respondents in Kolkata.**

Effect of age on time spent listening to music

A one-way ANOVA was conducted to compare the effect of age on time spent listening to music.

H₀₂: There is no significant difference in terms of time spent on listening to music among respondents of different age groups.

Descriptives

Time					95% confidence interval for mean			
	N	Mean	Std Deviation	Std Error	Lower bound	Upper bound	Minimum	Maximum
16-18	16	1.813	1.7500	.4375	.880	2.745	.5	8.0
19-25	116	2.582	2.2764	.2114	2.163	3.001	.5	8.0
26-30	22	3.023	2.8805	.6141	1.746	4.300	.5	8.0
Total	154	2.565	2.3289	.1877	2.194	2.936	.5	8.0

Test of homogeneity of variances

		Levene Statistics	df1	df2	Sig
Time	Based on mean	4.024	2	151	.020
	Based on Median	1.823	2	151	.165
	Based on median and with adjusted df	1.823	2	142.666	.165
	Based	4.688	2	151	.011

ANOVA

Time	Sum of squares	Df	Mean Square	F	Sig
Between Groups	13.703	2	6.851	1.268	.284
Within Groups	816.127	151	5.405		
Total	829.829	153			

In the Test of Homogeneity of Variance, the Levene's statistic is 4.024 ($>.05$) which means that variances are equal. In the ANOVA table, Significance comes out to be 0.284 (>0.05). Thus, the **null hypothesis cannot be rejected**.

Thus, there was no statistically significant difference between the age of respondents and time spent listening to music as demonstrated by One-way ANOVA. $F(2,151)=3.007, p=0.052$.

Effect of Mood on music Preferences

We asked our respondents to rate the effect of their mood on their music behaviour and preferences on a scale of 1 to 5 .The results overwhelmingly tended towards 5, indicating that mood plays a very major role in deciding music preference. The median response was 5 and the mean response was a staggering 4.09. It was further tested whether there is a significant difference between the responses of the two genders. This was done using a t-test with the help of SPSS.

Does the effect of mood on music preferences differ between the two genders?

H₀₃: There is no significant difference on the effect of mood on musical preferences between males and females.

t-test Group Statistics

	Gender	N	Mean	Std Deviation	Std Error Mean
Mood	M	82	3.96	.867	.096
	F	72	4.25	1.004	.118

Independent Samples Test

12		Levenes Test for Equality of variances						95% confidence Interval of Difference		
		F	Sig	t	df	Sig(2-tailed)	Mean Diff	Std Error Diff	Lower	Upper
Mood	Equal variances assumed	.855	.357	-1.901	152	.059	-.287	.151	-.584	.011
	Equal variances Not assumed			-1.883	141.348	.062	-.287	.152	-.587	.014

ONEWAY Mood by Gender

/STATISTICS DESCRIPTIVES HOMOGENEITY BROWNFORSYTHE WELCE
 /PLOT MEANS /MISSING ANALYSIS /POSTHOC=TURKEY ALPHA(0.05)

The group statistics table in the output above shows that the mean response for males is 3.96 while that for females is 4.25. For the independent samples test, we will look at the row of “Equal variances assumed.” The column labelled ‘t’ gives the t-value for the t-test which is 1.901 in this case. Further, the significance is found to be 0.059. Since this value is not equal to or less than 0.05, **we fail to reject the null hypothesis.** Thus, A t-test failed to reveal a statistically reliable difference between the mean effect of mood and music for males (M = 3.96, s = .0867) and for females (M = 4.25, s = 1.004), $t(152) = 1.461, p = .059, \alpha = .05$.

Preferred Mediums of Listening to Music:

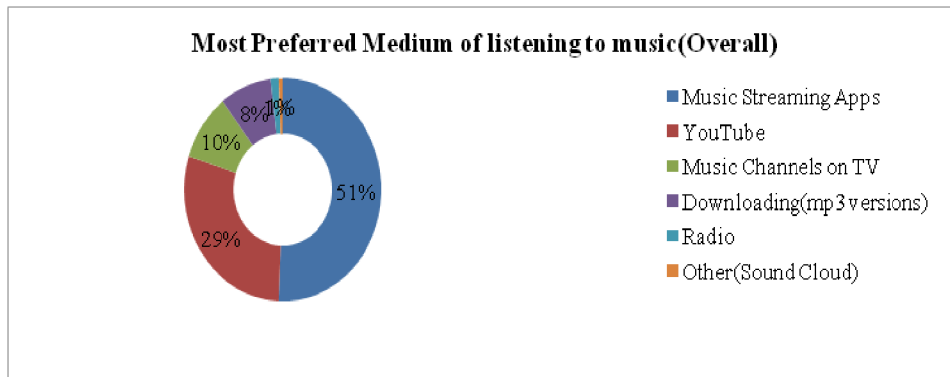


Figure 1: Preferred Medium for Listening to Music

As far as this research goes, not a single person from our sample in the age group of 16-30 listens to music through CDs/DVDs and Cassettes. The most popular medium turned out to be music streaming apps(50.6%); YouTube came next with 29% respondents choosing it as their single most preferred music listening medium.

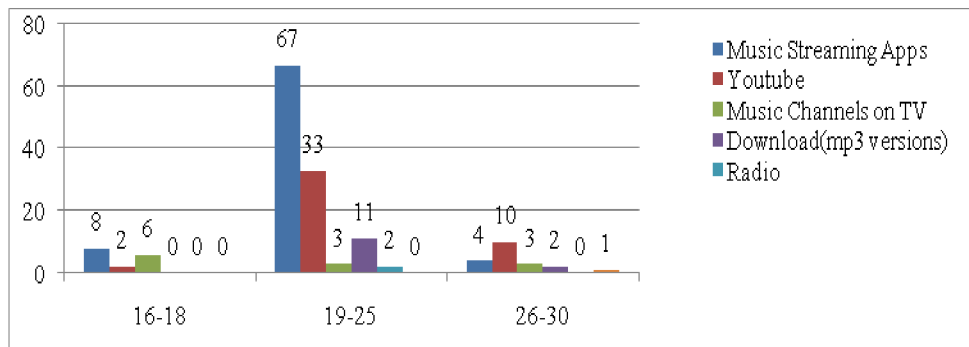


Figure: 2 Willingness to Pay for Music Streaming Apps.

The respondents were asked about their willingness to pay for music on a scale of 1 to 5, 1 meaning that they would never consider using premium versions and 5 indicating that they already pay or are extremely likely to pay for the same. The mean response(as can be viewed from the ‘Descriptive table’ below) is 1.86 with a standard deviation of 1.343. This indicates very low willingness to pay, i.e. Music streaming apps aren’t offering enough features in their premium versions which can make an average consumer motivated to pay for it. Also, only 39 (25% respondents) use premium versions while 75% users stick to the free versions.

Descriptives Descriptive Statistics

	N	Minimum	Maximum	Mean	Standard deviation
Willingness To pay	154	1	5	1.86	1.343
Valid N(listwise)	154				

Effect of income on willingness to pay

H₀₄: There is no statistically significant difference between willingness to pay for music streaming apps among different income groups.

We conducted a one-way ANOVA on SPSS between the five different income groups and their willingness to pay for music streaming apps.

Test of Homogeneity of variances

Willingness to pay		Levene Statistics	df1	df2	Sig
	Based on mean	13.105	4	149	.000
	Based on median	9.101	4	149	.000
	Based on median and with adjusted df	9.101	4	110.731	.000
	Based on trimmed mean	12.935	4	149	.000

ANOVA Willingness to pay

	Sum of squares	df	Mean Square	F	Sig
Between groups	72.295	4	18.074	13.211	.000
Within groups	203.842	149	1.368		
Total	276.136	153			

Robust Tests of Equality of Means Willingness to pay

	Statistics	df1	df2	Sig
Welch	11.454	4	53.596	.000

a Asymptotically F distributed

As can be seen in the Robust Tests of Equality of Means, the significance level is 0.000.(<0.05). Therefore, the p value is significant at the 0.05 level meaning that the **Null Hypothesis can be rejected**. Hence, there exists a statistically significant difference between the willingness to pay for music streaming apps among the five income groups. (p=0.000)

In order to see exactly between which groups this difference lie, we further conducted the Games Howell Post hoc test. The output and interpretation is given below:

(I) Income	(J) Income	Mean Diff(I-J)	Std error	Sig	95% Confidence Interval	
					Lower bound	Upper bound
Less than 50000	50001-100000	-.262	.150	.412	-.68	.16
	100001-150000	-.634	.254	.112	-1.36	.09
	150001-200000	-1.828	.400	.003	-3.06	-.60
	More than 200000	-1.751	.344	.000	-2.75	-.75
50001-100000	Less than 50000	.262	.150	.412	-.16	.68
	50001-100000	-.372	.268	.636	-1.13	.39
	100001-150000	-1.566	.409	.010	-2.81	-.32
	150001-200000	-1.489	.354	.002	-2.51	-.47
100001-150000	Less than 50000	.634	.254	.112	-.09	1.36
	50001-100000	.372	.268	.636	-.39	1.13
	100001-150000	-1.194	.457	.099	-2.54	.15
	150001-200000	-1.117	.409	.064	-2.28	.04
150001-200000	Less than 50000	1.828*	.400	.003	.60	3.06
	50001-100000	1.566*	.409	.010	.32	2.81
	100001-150000	1.194	.457	.099	-.15	2.54
	150001-200000	.077	.513	1.000	-1.40	1.56
More than 200000	Less than 50000	1.751	.344	.000	.75	2.75
	50001-100000	1.489	.354	.002	.47	2.51
	100001-150000	1.117	.409	.064	-.04	2.28
	150001-200000	-.077	.513	1.000	-1.56	1.40

Based on the significance levels obtained between each group (as viewed in the Sig. Column of the Multiple Comparison Table), we can conclude that statistically significant difference in terms of willingness to pay for music streaming apps exists only between the following groups:

1. Less than 50000 and 150,001-2lakhs (p=0.003<0.05)
2. Less than 50000 and more than 2 lakhs (p=0.000 < 0.05)
3. 50,001-100000 and more than 2 lakhs (p= 0.02 < 0.05)
4. 100001-150000 and more than 2 lakhs (p=0.064 < 0.05)

For income groups close to each other, the difference is not significant. Overall, there is a statistically significant difference between income and the willingness to pay for music streaming apps.(p=0.000). Further, a correlation test was done to see the direction of the effect of income on willingness to pay for music streaming apps.

H₀₅: There is no correlation between income and willingness to pay for music streaming services

Spearman correlation analysis between monthly household income and willingness to pay resulted in the following hypothesis, output and interpretation.

Nonparametric Correlations.

Correlations

Superman’s rho			Income	Willingness to pay
	Income	Correlation Coefficient	1.000	.457
		Sig(2-tailed)		.000
		N	154	154
	Willingness to pay	Correlation Coefficient	.457	
		Sig(2-tailed)	.000	
		N	154	154

Results for Spearman’s correlation showed that the correlation coefficient was 0.457 while the p-value was .000 which is statistically significant. Thus,we reject the null hypothesis. **There exists a moderate positive correlation between monthly household income and willingness to pay.**

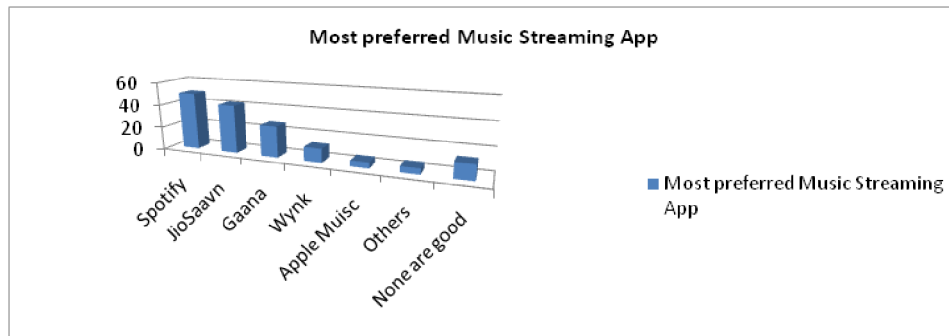


Figure 3: Most Preferred Music Streaming App Among Youths of Kolkata

Respondents were asked to choose their favourite music streaming app. Results indicated that Spotify is the most preferred music streaming app for youth in Kolkata based on their overall experience with various music streaming apps.

Findings

Based on the comprehensive analysis of the existing data and testing of the hypotheses we came up with the following findings-An average person in the age group of 16-30 in Kolkata listens to music for 2.5 hours on a typical day. There is a statistically significant difference between time spent listening to music between males and females. Females in the age group of 16-30 listen to music more than males in the same age group. There is no statistically significant effect of age on time spent listening to music. Music Streaming apps are the most preferred medium of listening to music. The youth is unwilling to pay for music streaming services by and large. Only 25 % respondents use premium versions. The median score for willingness to pay was 1 while the mean score was 1.86, both indicating that the youth does not consider the premium versions as value for money.

There exists a moderate positive correlation between monthly household income and willingness to pay for a music streaming service, i.e. Willingness to pay is expected to rise as income rise. There is a statistically significant difference between income and the willingness to pay for music streaming apps. This difference is most dominant between the lowest and the highest income groups. Spotify is the most preferred music streaming app among the youth in Kolkata as emerged from our study.

Conclusion

Our study highlighted many key findings that threw light on music listening habits of youth in Kolkata. From our study it was evident that females in their youth spend more time listening to music than their male counterparts. In consistency with earlier studies, results of this study also indicated that there is a strong relationship between mood and music preference in individuals. However, this effect is similar across genders with no statistically significant difference noted. Spotify seems to be a clear winner in terms of overall performance both for its free and premium versions. JioSaavn is a close competitor.

Contribution to Existing Literature

Our study is expected to make a modest contribution to the existing body of knowledge specially by addressing the gaps that were identified. Contribution of the present study relates to the fact that it brings to light the music listening behaviour of the youth of Kolkata by highlighting the fact that music streaming apps are the most preferred medium of listening to music. Spotify is the most preferred music streaming app. There exist significant differences between time spent listening to music between males and females and both the genders are equally driven by mood when it comes to deciding what music to listen to. There is a significant difference between income and the willingness to pay for music streaming apps.

Managerial Implications

The market for music streaming apps is ever growing with more and more youngsters turning towards it. Its biggest competitor is the video sharing platform of YouTube. The other methods of listening to music are on the decline. A considerable area of improvement for music streaming apps is to make

premium versions more attractive for users as the youth is largely unwilling to pay for it. Companies should first target premium versions to people with higher incomes as a moderate correlation exists in that regard.

Limitations

This research was conducted in the city of Kolkata and included 154 respondents up to 30 years old only. This might go down as a limitation of our study.

Scope of Future Research

Our study opens up different avenues for future research. In future studies can be conducted about ranking of important factors people look for in a music streaming app among more respondents and wider range of age groups in different geographic context.

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The Perceptions of the Adult Consumer Behavior towards PUBG Online Video Game during COVID 19 in Tiruchirappalli City

Ms . A. Shaira Bi & Dr. S. Vasanthi

ABSTRACT

Among youth, playing video games through online modes has become as one of the most ever spending leisure time. Many researchers have proved that video gaming has become very popular and also brings positive benefits through therapeutic, medical, health, cognitive, and educational benefits to the players. Player Unknown's Battlegrounds (PUBG), was authoritatively launched in December 2017 which has been downloaded over 100 million times on the Google, and can be played by smart phones, where the controls are very easy to learn and use. This study entitled, "The Perceptions among the adult consumer behavior towards PUBG online game during COVID 19 in Tiruchirappalli City" has been undertaken to analyse the selected objectives among 120 sample respondents. For the purpose of the study the questionnaire has been distributed among the sample respondents, using Rensis Likert Scale, (five point scale) through convenience sampling technique by adopting survey method in the selected study area. Statistical tools like Reliability test; Percentage analysis and Chi square test have been applied to measure the objectives of the study.

Keywords: Perception, adult consumers, PUBG game. Covid 19

Introduction

The online game PUBG (Player Unknown's Battlegrounds) is a famous game, extremely competitive game where it allocates the players to enter in the battleground to use their skills and basic ideas to have fun and joy among the players. The final survivor who plays till the end of the game is considered as the winners of game. This online game is played with multiplayer with maximum 100 players in 25 groups consisting of four in each group, or 75 players with the remaining 25 as robot players. This game is an action of shooting and dying process where bots threaten to attack or destroy the opponent players in the battlegrounds. This online PUBG video game has been under inspection for creating a

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violent attack behavior through game. Extreme aggression or violence can activate violent thoughts, emotions and rash behavior that finally affects the mental health of the player, thus it can cause a great health hazard to aggressive players. Thus, this research work, on the perceptions of the adult consumer behavior towards the game during Covid 19 has been undertaken to study in Tiruchirappali City.

Significance of the Study

Gaming is one of the forms of entertainment together with other older forms of activity such as reading books, watching movies, drawing, singing, dancing etc. Mr. Brendon Green, is the founder of PUBG along with Tencent Games, Bluehole Studio Inc and PUBG Corporation. Mr. Oliver Jones, Co-founder and Director of Bombay Play, a Bengaluru based game developer has said that reading many books and watching too many movies won't be labeled as book or movie addiction. PUBG was introduced in India in March 2018, and has reached a very high widespread among the game players. The players of this game can pick to join in their team as players around the world for various reasons as per their choice. This is a user friendly game through android mobile phones where the controls are easy to learn and use. The game permits the players to converse with their team players is the unique feature of this game.

Gaming disorder has been denoted as a pattern of constant and chronic gaming behavior where a player begins to give priority to gaming greater than other daily activities and interest to a point where it begins to affect their relationships, work and education. This has given a great ground for Indian doctors to concentrate on this disorder and to diagnose more on it.

Dr Samir Parikh, Director, Department of Mental Health and behavioural sciences, Fortis Healthcare, Delhi, India has pointed out that even if a small group of online video game players are addicted to play these games the gaming disorder will affect them as they spend their excessive time, as gaming is vulnerable to this condition. Dr. Priyanka Kapoor, Clinical psychologist, BLK Hospital, Delhi, India, has said that a wide range of adults are lost in the maze, before they know it and adults with a competitive streak, without a job or with less work load are more likely to fall for it and also added that it is important to differentiate between an interest and addiction. Thus, gaming is not limited to teenagers and is widespread in adults as well. This game has become more famous in the social media and has also paved the way to make an inquiry for being very aggressive and violent game with atrocious murders among the players. Hence, a research has been undertaken to study the "Perceptions of the adult consumer behavior towards PUBG online video game during COVID 19 in Tiruchirappalli City".

Statement of the Problem

This study aims to examine the perceptions of online video game players which have made them more addicted towards the game without concentrating on their routine work throughout the world. The PUBG game has appealed as a basic concept and had become very popular among the youth or adults. This game needs 100 players to start the game as an entry, as a big group inside the game and combat as dream gamers. A good player in this game has gained more fans and has become popular among them. This app has been downloaded by all the teens and adults and has made them more addicted as it is used as the second most downloaded app on IOS where it has crossed three million players through android mobiles and it is also available in XBOX and Microsoft Windows (laptops and PC's).

In the social media PUBG is a famous game and an aggressive game with excessive violence among the players which paves the way for violent thinking, sensation and behavior that might induce the

mental health of the player. Being a popularized game in the social media, this game has been under inquiry for being an aggressive game with brutal killings among the players. Unwarranted or excessive violence among the players can prompt violent thoughts, emotions and behavior that ultimately influence the mental health of the player. Thus this game being very aggressive might lead to rash behavior among the youth/ young adults during Covid 19 periods. Keeping in mind the importance of the today's generations this research work has been undertaken to study "The Perceptions of the adult consumer behavior towards PUBG on line game during COVID 19 in Tiruchirappalli City".

Review of Literature

Online video gaming has become one of the world's most popular leisure time activities among youth (Ballabio et al. 2017; Männikkö et al. 2015). Research has consistently shown that gaming can bring many positive benefits including therapeutic, medical, health, cognitive, and educational benefits (Griffiths 2002, 2019; Nuyens et al. 2019). However, for a small minority, gaming can be problematic and potentially addictive (Kuss and Griffiths 2012; Pontes and Griffiths 2014). One of the most popular games at the time of writing is Player Unknown's Battlegrounds (PUBG), a Bwinner-takes-all team game inspired by the Japanese film, Battle Royale. More specifically, in each game, PUBG parachutes 100 players on to a virtual island where teams of four fight each other to death until only one team is left alive. It was officially launched in December 2017 and can be played on both gaming consoles and smartphones (Quartz India 2018) and has been downloaded over 100 million times on the Google Play Store (Google Play 2019). In the present scenario, the game has over 30 million daily active users globally and is very popular in India (Bhattacharya 2019)—the country of focus in the present letter. A 2018 market research survey conducted among 1047 Indian gamers (Quartz India 2018) reported that PUBG was the most popular game (62%) followed by the games Free Fire (21%) and Fortnite (8%). Despite the popularity of gaming in India, there have been no dedicated studies on the negative psychosocial impact although there have been studies that have included Indian gamers (1) as part of psychometric evaluations of the properties of gaming disorder assessment instruments (e.g., Pontes et al. 2017), (2) in multi-country gaming samples but not including any breakdown of individual country characteristics or variables (e.g., Subramaniam et al. 2016), and (3) as part of studies examining problematic internet use and/or Internet addiction but with little or no information on Indian gaming except to say that gaming comprised one of the applications used among those experiencing problematic Internet use (e.g., Srijampana et al. 2014). While there are a few case study accounts of problematic gaming in the medical and psychological literature spanning over 35 years (e.g., Griffiths 2010; Keepers 1990; Kuczmierczyk et al. 1987; Ross et al. 1982; Torres-Rodriguez et al. 2019), there have never been any published cases in the medical or psychological literature involving Indian gamers. However, based on media reports, case studies of problematic gaming in India have been highly prevalent over the past few months, particularly in relation to PUBG gaming.

Research Gap

From the above literature review, it has been pragmatic and comprehended that numerous studies made in the past in various dimensions on PUBG online video game. Few studies have been dealt with attitudes as a popular game (Ballabio et al. 2017; Männikkö et al. 2015), game with positive benefits (Griffiths 2002, 2019; Nuyens et al. 2019), dedicated studies on negative psychosocial impact (e.g., Pontes et al. 2017), problems on internet usage (Srijampana et al. 2014), problematic gaming in the

medical and psychological literature (Griffiths 2010; Keepers 1990; Kuczmierczyk et al. 1987; Ross et al. 1982; Torres-Rodriguez et al. 2019), etc. Hence there is a research gap to study the perceptions of the adult consumer behavior towards PUBG on line game during COVID 19 in Tiruchirappalli City, Tamil Nadu. Thus, it has been identified as the research gap in this study. Hence, this research targets to study the perceptions as the main four factors such as Zeal/Zest, Adventure, Gamer Loyalty, and the Team spirit towards the perceptions of the adult consumer’s behavior towards PUBG online video game during COVID 19.

Objectives of the Study

For the purpose of this research, the objectives of the study are focused to highlight the demographic factors of the adult consumers and to analyse the perceptions of the adult consumer behavior towards PUBG on line game during COVID in Tiruchirappalli City, Tamilnadu- South India.

Research Methodology

This research is descriptive in nature which examines, “The perceptions of the adult consumer behavior towards PUBG on line game during COVID 19 in Tiruchirappalli City”. Primary data was administered to collect data through a well structured questionnaire using Rensis Likert’s five point scales from 120 sample respondents using convenience sampling technique by adopting survey method. Convenience sampling is a non-probability sampling technique where subjects are selected because of their convenient accessibility and proximity to the researcher. Secondary data has been obtained from the website, journals, articles, newspapers, magazines, and unpublished thesis. The collected data has been analyzed with the help of statistical packages namely SPSS 20 by using statistical tools such as Data Validity & Reliability Test and Chi-square test.

Analysis and Interpretations

The most widely used measure to assess the internal consistency of constructs is Cronbach’s alpha. The generally agreed upon value of Cronbach’s alpha is 0.70, although it may decrease to 0.60 in case of exploratory research (Hair et al. 2006; pp.137). The reliability test has been depicted in the table given below:

Table- 1: Reliability Test

General Variables	Number of items	Range	Cronbach’s Alpha
Demographic and Motivating factors of the adolescent video game players towards PUBG on line video game	10	9-18	.669
Perception, and the level of satisfaction among the adolescent video game players towards PUBG on line video game	10	19-28	.804
Overall reliability	20	1-30	.938

In this research, the reliability measure for the whole scale is 0.938 which is acceptable as the reliability for all the constructs in the values. The result of Cronbach's alpha draws a significant amount of correlation between the variables tested. The validity of a test is the extent to which differences in scores reflect differences in the measured characteristic. Predictive validity is a measure of the usefulness of a measuring instrument as a predictor. Proof of predictive validity is determined by the correlation between results and actual behavior and construct validity is the extent to which a measuring instrument measures what it intends to measure.

Table- 2 : Table showing Demographic Profile of the Sample Respondents

Demographic factor	Particulars	Frequency	Percentage %
Age	20-30 years old	48	40.00
Gender	Male	80	80.00
Marital status	Unmarried	83	83.00
Education	Degree	75	63.00
Occupation	Students	57	57.00
Family Type	Nuclear	65	65.00
Monthly Income of the family	Rs. 50,000 – Rs. 1,00,000.	86	71.10
Number of dependents in the respondent's family	Less than 2	76	64.00

Source: Primary data

The Demographic profile stated the age wise distribution of the sample respondents have been demonstrated that 21.7% of the respondents are above 30 years of the age group, 38.3% of the respondents are below 20 years of the age group, The gender wise distribution has been inferred that 80% of the sample respondents are male and 20% of the sample respondents are female. Marital status of the sample respondents inferred that 69.2% of the sample respondents (83) are unmarried and 30.8% of the sample respondents (37) are married. The education of the sample respondents reveals that 3.3% (4) of the sample respondents are Higher Secondary school students, 15.8% (19) are ITI/Diploma holders, 62.5% (75) are degree holders, 19.5 (22) and 5.8 (7) are Post-Graduate degree holders. The occupation of the sample respondents reveals that 56.7 (68) of the sample respondents are students, 27.5% (33) are working in private concerns, 15.9% (19) are self-employed sample respondents. Thus, a majority of 68 (56.7%) of the sample respondents are degree holders.

Analysis & Interpretations

This study entitled “The perceptions among the adult consumer behavior towards PUBG on line game during COVID 19 in Tiruchirappalli City”, has been portrayed here with the analysis and interpretations, using reliability test, cross tabulations, and Chi-square tests. Hypothesis has been framed to prove the significance difference between the independent and the dependent variables.

Table: 3 : Table showing the age group of the sample respondents and the perceptions among them about the PUBG game players

Age Group (in years)	Perceptions of the respondents			Total	Chi-square Value	‘P’ value
	Low	Medium	High			
Below 20 years	11 (23.9%)	27 (58.7%)	8 (17.4%)	46 (100%)	4.314 ^a	<0.001
21-30 years	5 (10.4%)	31 (64.6%)	12 (25.0%)	48 (100%)		
Above 31 years	4 (15.4%)	14 (53.8%)	8 (30.8%)	26 (100%)		
Total	20 (16.7%)	72 (60.0%)	28 (23.3%)	120 (100%)		

Source: Primary Data

Note: ** denotes significant at 1% level.

The cross tabulations portrayed in the above table explains the perceptions of the sample respondents about the online video PUBG game players in Tiruchirappalli City, between three age groups of the sample respondents in this study. Among 120 sample respondents, 27 (58.7%) are in the age group below 20 years, fall under the moderate, 11 (23.9%) as low, and 8 (17.4%) as high perceptions about the PUBG game players. While 31 (64.6%) fall under the moderate, 12 (25.0%) as high perceptions and 5 (10.4%) as low perceptions among the PUBG game players between the age group 21- 30 years old. In the age group above 31 years, 14 (53.8%) fall under the moderate, 8 (30.8%) as high, and 4 (15.4%) as low perceptions about the PUBG game players. Thus, it shows that there was no limit for the age group of the players as the game addiction has reached all the age level of the players. In the beginning it was accepted as a game to pass or while away the time, but later on it twisted out into an addiction among the players.

Chi-Square Test

This test was applied to analyze the perceptions of the sample respondents among the online video PUBG game players in Tiruchirappalli City.

Hypothesis- I

Null Hypothesis: There is no significant association between age group and the perceptions of the sample respondents of the one line PUBG video game players

The above table proves the results of association between the age and the perceptions of the (sample respondents) online video PUBG game players in Tiruchirappalli City. Hence, the Chi-square value is significant at 0.01 per cent level. With 120 cases, the value of Pearson Chi-square shows 4.314, with 4 as degree of freedom, with .036 as significance level, which is less than the “p” value 0.001. Therefore, the null hypothesis (H0) is rejected and the alternative hypothesis (H1) is accepted, so that there is a significant association between age group and the perceptions of the sample respondents of the one line PUBG video game players.

Student “t” Test

The *t-test* is any statistical hypothesis *test* in which the *test* statistic follows a *Student’s t*-distribution under the null hypothesis. A *t-test* is most commonly applied when the *test* statistic would follow a normal distribution if the value of a scaling term in the *test* statistic were known. For the purpose of analyzing the marital status and the various dimensions of the perceptions of the adult consumer’s behavior towards PUBG online video game during COVID 19 in Tiruchirappalli City, Tamil Nadu, Student “t” Test has been applied.

Hypothesis- II

There is no significant difference between the Marital status and the various dimensions of the perceptions of the towards PUBG online video game during COVID 19 of the sample respondents

Table- 4 : Marital Status and Four (4) Dimensions of the Perceptions of the Consumers (Student’s “t” Test)

Dimensions	Marital Status				“t” value	‘P’ value
	Married		Unmarried			
	Mean	SD	Mean	SD		
Zeal and Zest	16.90	2.385	17.02	2.820	.614	.003
Adventure	18.31	2.686	19.84	3.981	17.772	.004
Gamer Loyalty	16.27	2.723	16.99	3.094	13.188	.105
Team Spirit	12.81	2.953	13.37	3.443	.077	.006

Source: Primary Data

Note: 1. ** denotes significant at 1% level

2. * denotes significant at 5% level

Since 'P' value is less than 0.01, null hypothesis is rejected at 1% level with respect to the several dimensions of the perceptions of the adult consumer's behavior towards PUBG online video game during COVID 19 in Tiruchirappalli City, Tamil Nadu. Based on mean score, it is observed that the unmarried sample respondents have been influenced more than the married sample respondents towards the perceptions of the adult consumer's behavior towards PUBG online video game during COVID 19 in Tiruchirappalli City, Tamil Nadu. Since 'P' value is less than 0.05, the null hypothesis rejected at 5% level, with regard to other dimensions such as Zeal/Zest, Adventure, Gamer Loyalty, and the Team spirit of the sample respondents towards the perceptions of the adult consumer's behavior towards PUBG online video game during COVID 19. Based on mean score, it is observed that the unmarried sample respondents have been influenced more than the married sample respondents based on the marital status other than the dimensions such as Zeal/Zest, Adventure, Gamer Loyalty, and the Team spirit of the sample respondents towards the perceptions of the adult consumer's behavior towards PUBG online video game during COVID 19. Thus, there is a significant difference between unmarried and married sample respondents with respect to the main four dimensions towards the perceptions of the adult consumer's behavior towards PUBG online video game during COVID 19. Hence the alternate hypothesis is accepted.

Conclusion

PUBG online live streaming game was introduced through windows in the beginning and it had only few reviews, but when it was released through mobile phones it started like a natural forest fire among the game players in India (Bhattacharya 2019). Though very interesting (Ballabio et al. 2017; Männikkö et al. 2015) for the adult consumers, this game was totally an adventurous game to play with zest and zeal, and with team spirit in order to spend their leisure hours with friends playing online with game loyalty. The results of the Percentage analysis show that majority of the players are between the age group 21-30 years, students of under graduation, unmarried, living in nuclear family with few dependents who have very less responsibilities at home. The findings show that the e-players have been influenced more by this online game, as they enjoyed every moment of their presence in the game as zeal and zest by spending their time in adventuring more ideas of the game by coordinating, with the integrity of their friends by showing the sense of game loyalty and team spirit. The student "t" test also proves that the unmarried adult online PUBG players had spent most of their time enjoying the spirit of the game during day and night, by laughing, shouting, talking, and giving directions to their friends to attack the opponent team. Thus, this PUBG game has influenced the adult players and turned them as puppets to dance according to the tune of the App, in smart phones. The PUBG game players have gained multi-tasking skills or abilities like better understanding, speed-reading power, dealing unknown people, power focus, to improve in very fast reflexes of a person. On the other hand, this game as every day learning has engaged and improved the managerial skills of the adult game players to involve with Planning, Organizing, Directing, Coordinating, Controlling and taking good decision with constant interest and enthusiasm.

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The Impact of Product Design on Purchase Intention of Semi-Durable Products

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ABSTRACT

In a world of cutthroat competition, consumers have a multiple options in selecting a particular product. Product Design acts as a commanding feature in the product mix. Although product design has been recognized as influencing attribute of a product, little is known as the cognition and affective states of consumers from product design. The study investigates cognition and affective states in semi-durable products based on Mehrabian and Russell's Framework. Cognition and Affective states are internal states developed within an individual in response to a stimulus which lead to a particular response. The states are paramount in developing an intent to purchase within a consumer. Consumers assess and create an opinion about a product based on its product design. Nevertheless, how these judgements of consumers affect purchase decisions is hardly explored. The objective of the present study is to identify how product design leads to cognition and affective states with in a consumer and its influence on purchase intention particularly in semi-durable products. The findings shows the product design of semi- durables has a very strong influence on the cognition and affective states of the consumer. The study implies that consumers judge the product and attach emotions to the product on the basis of product design. The results of this study will be fruitful to the corporate world that focus on product attributes to increase revenue and gain advantage over competition.

Keywords: *Product Design, Cognition. Affect, Purchase Intention.*

Introduction

Innumerable products are available in the market that is used for various purposes like for work, completing a given task, movement, entertainment and so on. While choosing a product, we find ourselves in a difficult position as there are several alternatives available to us. The choice depends on numerous factors and among them characteristics of the product play an immense role. Product is an important element of the marketing mix and product design have been used by the marketer to gain a competitive advantage in the market place (Berkowitz 1987). Product design play a vital role in appealing the potential consumer. Products through their design can communicate value to the consumers as well as stand out

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from its competitors (Berkowitz, 1987; Dumaine, 1991; Lloyd-Jones, 1991; Midgley, 1977)

Product design acts as a tool for communicating about the product to its users as well as persuades consumers to make a choice. It has induced the consumers to judge quality of the product on the basis of the product design (Bloch, 1995). Aesthetic properties of the product also induce consumers to judge the quality and nature of their usage. Studies on consumption and usage experience have addressed that consumer's focus on emotional design characteristics such as attractiveness and creativity (Norman, 2013).

Several factors have been recognised in the purchasing process of consumer, to purchase a product or opt for a specific brand (Shafiq et al., 2011). In addition to the product design, brand familiarity and product attitude also has an effect on purchase intention. Product design has been studied on various context but there is a need to concentrate on impact of cognitive and affect.

Product design includes product attributes along with product form and aesthetic features of the product which complement to the overall impression of the product. Studies also pinpoint the need to explore product design more on the basis of their durability (Kim & Lennon, 2010). Product design has been an unquestioned determinant particularly in semi-durable products. Semi –durable products are those products that are neither perishable nor lasting in nature, example: clothing, footwear, ornaments, etc. Hence, this study will be on the product design of semi-durable products.

Review of Literature

A product is a combination of physical, aesthetic and symbolic characteristics and attributes that are to satisfy the consumers' needs (Crilly et al., 2004). A product is bought by a consumer not only due its functionality but due to other attributes like convenience, safety, individuality, stylishness, etc.

According to Levitt (1983) an overall product concept constitutes the following features: generic product, expected product, extended product and potential product. Another categorisation of products is by the types of benefits they provide. Function benefits involve physical benefits, psychological benefits which include satisfaction of the needs that come from the personality of the user and social benefits which include satisfy needs of relationships with other people (Lai, 1995). These aspects are influenced by product design.

Studies of empirical aesthetics provide possible dimensions for describing the relation of visual design qualities such as prototypicality and unity (Veryzer & Hutchinson, 1998). Margolin and Buchanan (1996) defines unity as the level of congruity among the elements of form with purpose of the given object and prototypicality refers to how the given object is representative of its category satisfying its purpose or something which acts as model in a category which it belongs.

There are differences between affective and cognitive judgements: cognitive judgements evaluate what is in the stimulus (how the product design is), whereas affective judgements involve the self in that stimulus (I like the design or the colour or the shape) (Zajonc & Markus, 1982). It is not easy to determine the primacy of affect or cognition in a decision-making process; hence these hinder our ability to assess its influence on other constructs, such as brand beliefs and product attitudes, etc.

Berger and Mitchell (1989) assumes that change in attitude leads to change in behaviour. Fishbein and Ajzen (1975) describe attitude as evaluative beliefs. The information that is readily accessible at

the time of purchase about a brand or a product may increase brand familiarity and product attitude (Berger & Mitchell, 1989). Compte and Postlewaite (2004) suggests the use of feelings as an independent construct and also states the influence of confidence on emotions.

The neuropsychological research findings support the partial independence of affect and cognition which means that affective responses can occur with little or no cognitive processing (LeDoux et al., 1990). Similarly, Zajonc (1980) states that “affect and cognition are separate and partially independent systems and that although they function conjointly, affect could be generated without a prior cognitive process.”

In light of the existing literature, it is essential to reassess the relationships between variables with a focus on cognition and affect on purchase intention from product design of semi-durable products

Statement of the Problem and Research Gap

Psychological and behavioural responses of consumers have given due consideration (Lee et al., 2011; Suwelack et al., 2011) but the impact of cognitive and affect to purchase intention based on the product design of semi-durable products is unrecognised in the literature.

Cognitive responses refer to response based on consumers’ beliefs, thoughts and judgements on the basis of the product design (Bitner, 1992; Solomon, 1983; Bloch, 1995). Affective responses refer to the emotions and drives associated with an attitude object (Keer et al., 2013; Millar & Tesser, 1986). Affective and cognitive responses based on product design of semi-durable products may influence consumer’s purchase intention which establishes the need for the current study. The study attempts to answer the following questions:

- a) How the product design leads to consumer cognitive and affective responses?
- b) How cognitive and affective responses affect the purchase intention?

Objectives

The study deals with the following objectives:-

- To know whether product design leads to consumer cognition and consumer affective responses
- To understand how cognitive and affective responses affect the purchase intention.
- To identify whether brand familiarity and product attitude has an impact on purchase intention along with product design

Scope of the Study

Products such as Foot wares, Ornaments, Clothes, Home furnishing is taken into consideration for this study to bring attention to the product design of semi- durable products. Continuous growth of competing products in several industries brings out the role and impact of product design as necessity for successful company performance (Lee et al., 2011). Along with cognition and affect, the effect of other factors such as brand familiarity and product attitude affect the purchase intention but the relationship is to be tested and established. Hence this study focuses on brand familiarity and product attitude along with product design as well.

Model Development

The model adopts its variables from existing literature tests its applicability on semi-durable products. The framework Stimulus–Organism–Response (S–O–R) framework (1974) has been widely tested and proved in literature and the two main variables cognition and affect have been included in the model based on this framework. A clear view about the model development is given below:

Stimulus–Organism–Response (S–O–R) framework (1974)

This study is based on the Mehrabian and Russell’s Stimulus–Organism–Response (S–O–R) framework (1974). The framework states that when an individual meets a stimulus (S) the individual develops internal states (O) which initiate to a particular response (R). The stimuli develop individuals’ cognitive and emotional states, which in turn determine behavioural responses (Lee et al., 2011). This theoretical lens is used to confirm whether a well-established framework will support in the case of product design of semi-durables.

Product Design of Semi-durables

Product, one of the 4 P’s of marketing mix and product design being an important ingredient of the success of the product. Scholar have discussed this term as a combination of factors that contribute to a visual effect (Hollins & Pugh, 1990; Lewalski, 1988). These characteristics can be to deliver a value to the consumers regarding their functionality or to enhance their user experience or may be related to their aesthetic features. Product design in Semi-durables will act as a stimuli in this study. Existing literature states that product design must be explored on the basis of their durability (Kim & Lennon, 2010). It was found semi-durable goods need to be focused. (Kim & Lennon, 2010)

Cognition and Affect

The internal states are the cognitive and affective states of the consumer. Cognitive response refers to response based on consumers’ beliefs, thoughts and judgements on the basis of the product design, the cognitive state relates to how consumers evaluate a product based on the product design and form a product attitude based on the design (Bloch, 1995). Affective responses refers to the emotions and drives associated with an attitude object (Keer et al., 2013; Millar & Tesser, 1986). Affective responses discusses the emotional reactions and the drives that develop within a consumer (Mehrabian & Russell, 1974) based on the product design. Holbrook and Zirlin (1985) suggest that “experience of aesthetic value can be realized during the functional usage of a product” which might be true in case of semi-durable products.

Product Attitude

Product attitude refers to the consumer’s attitude about a product. Attitude is defined as “a learned predisposition to respond in a consistently favourable or unfavourable manner with respect to a given object” (Fishbein & Ajzen, 1975, p. 6). According to the theory of reasoned action (TRA) (Ajzen & Fishbein, 1980), a person’s overall attitude towards an object determines an individual’s intention to perform a behaviour with respect to that object. Therefore attitude of a consumer in a product tends to lead to purchase intention.

Brand Familiarity

Brand familiarity refers to how much a consumer is familiar about a brand. Brand familiarity reflects the degree of experience a consumer has with a brand. It can be directly or indirectly (Alba & Hutchinson, 1987; Kent & Allen, 1994). Consumer might be familiar with the brands and at times might be unfamiliar with the brands (Stewart, 1992). A brand may be familiar with the direct use of a product or through peer groups, ads or marketing communications for the brand, the way a brand is positioned, packaged and so on. This brand familiarity may affect the purchase intention of the consumer.

Purchase Intention

“Purchase intention is the preference of consumer to buy the product or service.” (Younus et al., 2015). It means the intent of a consumer to purchase the product after evaluation. Many factors lead to purchase intention which is cognition, Brand familiarity, product design, product attitude, etc. Jayachandran, Hewett and Kaufman (2004) explains the fundamental role of product knowledge of the consumer. Another research of Fung, Chong and Wang (2004) revealed that consumer’s attach sentiments towards design and packaging affect purchase intention. Product attitude stands as a factor of purchase intention which implies the relationship with product and consumers (Payne & Holt, 2001)

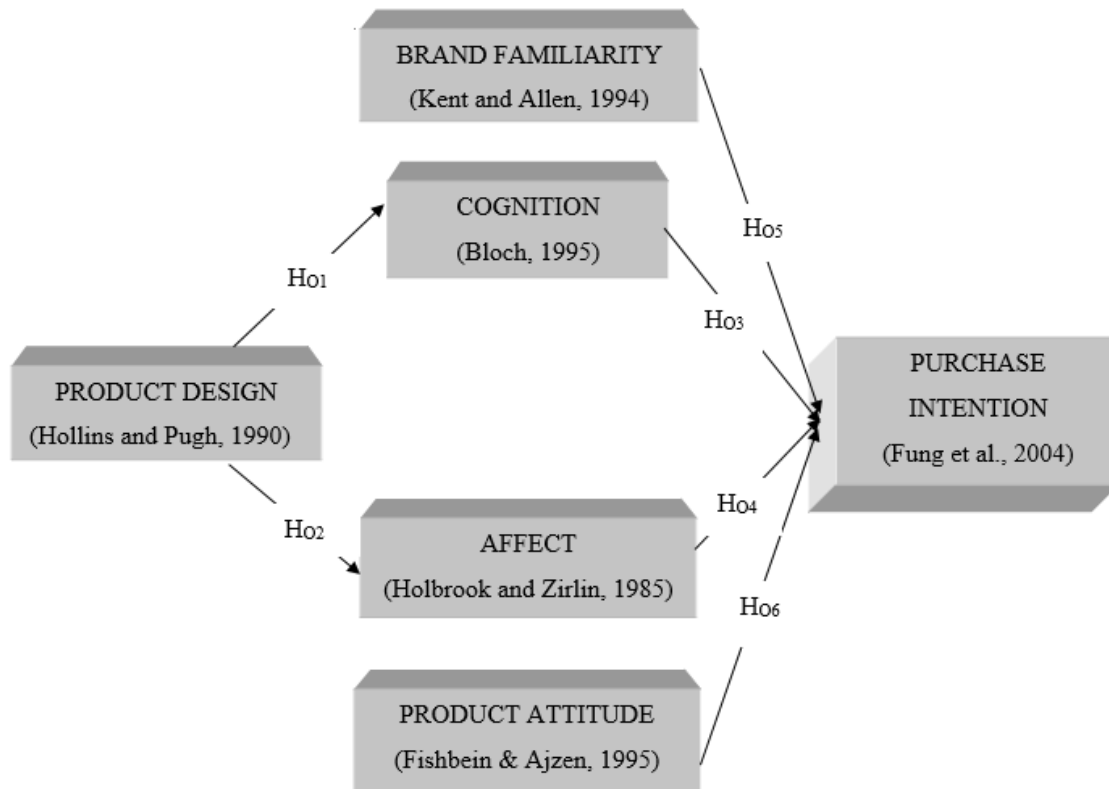
Cognitive and affective states of the consumer lead to a particular response. In this study we will look into the intention of the consumer to purchase a product based on the internal states developed by the product design. We believe product attitude perceived by the consumer as well as brand familiarity also affect purchase intention along with consumer cognition and consumer affect. The impact of brand familiarity and product attitude on purchase intention is also looked upon.

Consequently, the following null hypotheses are formulated:

- H01: Product design has no significant effect on Cognition.
- H02: Product design has no significant effect on Affect.
- H03: Cognition has no significant effect on Purchase intention.
- H04: Affect has no significant effect on Purchase intention.
- H05: Brand familiarity has no significant effect on Purchase intention.
- H06: Product attitude has no significant effect on Purchase intention

Based on the above review the following Model was developed for Validation

Figure 1: Hypothesized Model



Methodology

In the present study, data were collected by survey method with the help of structured questionnaire. Both primary and secondary data sources were used for the study. Primary data is collected from 360 respondents (consumers) by using random sampling. Responses were measured by a 5-point Likert-type scale ranging from strongly agree (5), agree (4), neutral (3), disagree (2) and strongly disagree (1). The collected data was analysed using various mathematical and statistical tools. The results are discussed below.

Data Analysis and Result

Demographic Profile:

The demographic characteristics are presented in table 1. Out of the total collected responses, only 360 responses were completed and usable for data analysis. A brief profile of the respondents is stated below:

Table 1: The general profile of the total 360 respondents.

Demographic Factors	Item	Frequency	Percentage
Gender	Male	169	46.9
	Female	191	53.1
Age Group	Below 25	167	46.3
	25-35	63	17.5
	35-45	54	15.0
	45-55	45	12.5
	Above 55	31	8.7
Purchase of Semi-durable products			
Purchase of Footwear	Monthly	9	2.5
	Quarterly	211	58.6
	Half Yearly	97	27.0
	Yearly	43	11.9
Purchase of Ornaments	Monthly	12	3.3
	Quarterly	32	8.9
	Half Yearly	59	16.4
	Yearly	257	71.4
Purchase of Clothes	Monthly	153	42.5
	Quarterly	137	38.0
	Half Yearly	59	16.4
	Yearly	11	3.1

Source: Primary Data

Descriptive Statistics

The constructs and measures used in the study indicated mean to be above 4 and the standard deviation score for all of them were close to 1. It showed that majority of the respondents agree with the statements. The constructs used were product design, brand familiarity, product attitude, cognition, affect and purchase intention.

Exploratory Factor Analysis (EFA):

Exploratory Factor Analysis (EFA) was conducted on 28 measures (items) to validate constructs with a sample of 160 respondents initially. In order to check the suitability of the data for Factor Analysis, Correlation Matrices were computed and it was found that there is enough correlation between variables. Kaiser-Meyer-Olkin Measure of Sampling Adequacy is 0.916 which is acceptable to continue with factor analysis and Bartlett's Test of Sphericity is significant ($p < 0.001$) which means that the distributions are approximately multivariate, normal and acceptable for factor analysis as shown in Table 2.

Table 2: KMO and Bartlett's Test

No. of items	28
Kaiser-Meyer-Oklin Measure of Sampling Adequacy.	0.916
Bartlett's Test of Sphericity Approx. Chi-Square	2759.139
Degrees of Freedom	378
P Value	<0.001**

Source: Authors' calculation

**Denote Significant at 1%

After standards indicate that the data is suitable for Factor Analysis, Principal Component Analysis was employed for extracting the factors. The extracted factors are then rotated using the widely used 'Varimax Rotation method' and the Rotated Component Matrix. It gives an idea of how the factors initially extracted differ from each other and provide a clear picture of which item load on which factor.

Model Evaluation and Confirmatory Factor Analysis (CFA):

The measurement model is assessed through confirmatory factor analysis (CFA) that tests the convergent validity and discriminant validity of the constructs under study. The convergent validity of the constructs is established through Composite Reliability (CR) and Average Variance Extracted (AVE) values. A second sample of 360 respondents were collected The CR of all the 6 variables is greater than 0.7 and AVE values are also above the suggested threshold of 0.5 (Fornell & Larcker, 1981).

For establishing adequate discriminant validity, the square root of AVE values (diagonal elements) must be less than the inter-construct correlation (off-diagonal elements) for all constructs (Fornell & Larcker, 1981). It was found that seven factors had Eigen values which is greater than .5 and therefore they were all extracted. The factor loadings are shown in Table 3 and discriminant validity results are shown in Table 4.

Table 3: Confirmatory Factor Analysis

Constructs	Measures	Factor loadings	Cronbach's Alpha	C.R.	AVE
Product Design	PD1	.671	.788	.80	.523
	PD2	.787			
	PD3	.679			
	PD4	.769			
	PD5	.673			
Brand Familiarity	BF1	.539	.791	.75	.541
	BF2	.808			
	BF3	.841			
	BF4	.630			
Product Attitude	PA1	.645	.700	.77	.513
	PA2	.824			
	PA3	.782			
	PA4	.772			
Affect	A1	.639	.822	.78	.515
	A2	.804			
	A3	.799			
	A4	.831			
Cognition	C1	.647	.836	.72	.533
	C2	.641			
	C3	.737			
	C4	.771			
	C5	.787			
	C6	.657			
Purchase Intention	PI 1	.791	.831	.81	.518
	PI 2	.834			
	PI 3	.758			
	PI 4	.775			
	PI 5	.616			

Table 4: Discriminant Validity Results

Constructs	Product Design	Brand Familiarity	Product Attitude	Affect	Cognition	Purchase Intention
Product Design	.52					
Brand Familiarity	.047	.54				
Product Attitude	.287	.052	.51			
Affect	.425	.098	.309	.51		
Cognition	.225	.013	.178	.425	.53	
Purchase Intention	.235	.052	.298	.287	.178	.51

The goodness for the measurement model is estimated by using the maximum likelihood estimation method. Bentler and Bonett (1980) recommended specific criteria for assessing the model fit: $X^2/df < 3$, $GFI > 0.8$, $NFI > 0.90$, $CFI > 0.90$ (Bentler, 1992), p close near to and $RMSEA < 0.5$. The model fit indices for the measurement model are within the suggested values (Table 5) indicating appropriate fit of the measurement model.

Model Validation and Hypotheses Testing

The General Fit indices of the structural model which is validated is given in table 5. The goodness-of-fit indices of the structural model indicate that the model has a good fit with the following indices values: $X^2/df = 2.585$, $GFI = 0.921$, $NFI = 0.892$, $AGFI = 0.896$, $CFI = 0.939$ and $RMSEA = 0.073$

Table 5: Model Estimates and Fit Indices of the Model

Fit Indices	Model Value	Threshold Value
X^2/df	2.585 ($X^2=865.937$, $df=335$)	5.0 (Wheaton et al., 1977) to as low as 2.0 (Tabachnick & Fidell, 2007).
GFI	.921	>0.9 Bentler and Bonett(1980)
AGFI	.896	>0.80 Hair, Babin and Anderson (2010)
NFI	.892	>0.90 Bentler and Bonett(1980)
CFI	.939	>0.95 Bentler and Bonett(1980)
RMSEA	.073	<0.80 MacCallum et al (1996)

The proposed hypothesis are tested using structural equation modelling (SEM) and the results are presented in Table 6. The results indicate a significantly positive relationship between Product Design and Cognition (H_{01}) ($\hat{\alpha} = 0.23$, $p < .001$); Product design on Affect (H_{02}) is found significant ($\hat{\alpha} = 0.24$, $p < .001$). Cognition on purchase intention (H_{03}) is significant ($\hat{\alpha} = 0.122$, $p < .001$) and product attitude on purchase intention (H_{06}) is found to be significant ($\hat{\alpha} = 0.127$, $p < .001$). All the null hypothesis are rejected means that they have significant influence between the variables.

Table 6: Regression Weights of Variables in the Model

Independent Variable	Dependent Variable	Hypothesis	Standardised beta co-efficient	P value	Results
Product Design	Cognition	H_{01}	.232**	<.001	Significant
Product Design	Affect	H_{02}	.243**	<.001	Significant
Cognition	Purchase Intention	H_{03}	.122**	<.001	Significant
Affect	Purchase Intention	H_{04}	.112**	<.001	Significant
Brand Familiarity	Purchase Intention	H_{05}	.091**	<.001	Significant
Product Attitude	Purchase Intention	H_{06}	.127**	<.001	Significant

** Significant at 1% Level

Source: Authors' calculation

The validated model is given below:

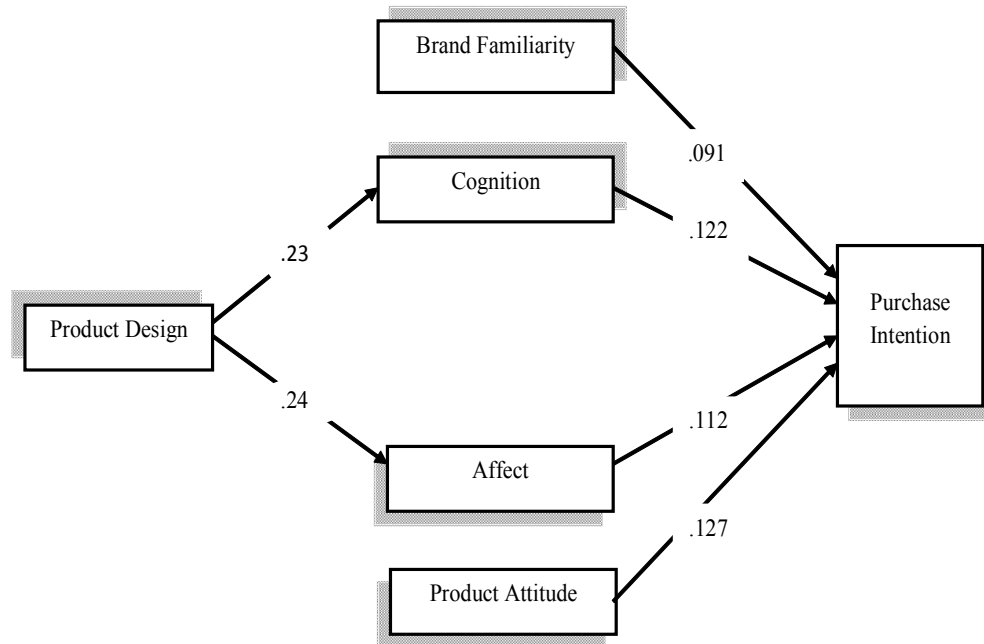


Figure 2: Empirically Validated Model

Findings and Discussions

The results of analysis present a positive and significant relationship between the variables. Product design has a very strong influence on the cognition and affective states of the consumer. This urges a need for business organization to focus attention on product design of a product especially in the case of semi-durables. It can be said that consumers judge the product and attach emotions to the product on the basis of product design.

Among the various dimensions, Product attitude has the strongest impact on purchase intentions. This reveals that product related beliefs and knowledge are the main factor that affects consumers purchase decision. Thus, it is necessary that positive attitude should be encouraged about a product.

Factors of cognition and affect have effect on purchase intention. Consumers perceive an opinion which eventually affect the intention of the individual to purchase a product. The attitude or the motions both positive and negative also affect the intention to purchase of a consumer. Brand familiarity also has a positive influence comparatively less than the other factors. Most of the people think that it is important to know about the brand.

These findings assist the marketers in devising pertinent strategic plans for future applications. The product design acts a key ingredient in marketing a product which paves way for evolving internal urges which ultimately lead to purchase intention. So, the enterprises should definitely take into account

product attitude and heed to consumers' attitude of a product in order to improve its sales and gain a competitive edge.

Theoretical Contributions of the Study

In spite of the limitations in the present study, it makes significant contribution to the existing literature by examining the influence of cognition and affect on purchase intention from product design. The study makes an effort to understand the product design of semi-durable products and proves to benefit the corporate world there is a need to concentrate on product design in semi-durables especially while introducing a new brand or a product in the market to gain attention of consumers. Product design in semi-durables make this novel in nature. This study helps the marketers to understand internal states developed in a consumer through product design and its effect on purchase intention. This would help them to create more sales revenue and also to gain a preferential status in the market by using product design as a competitive weapon.

Conclusion and Scope for Future Research

Product design is an influential element of the product mix. Consumer's judge and associate to a product through their product design. The product design attributes to certain psychological and behavioural responses. The objective was to study the influence of cognition and affect on purchase intention arising from product design of semi-durable products. It was found that product design had greatly impacted in creative cognitive and affective states within a consumer. Consumers develop an attitude based on product design which influence purchase intention. The study focuses on understanding consumers' cognition and affect and its influence on purchase intention

The present study contributes to the literature by considering product design of semi-durables. The results show that product design of semi-durables has a very strong influence on the cognition and affective states of the consumer. Product design paves way for evolving internal urges which can ultimately lead to purchase intention. This study helps the marketers to understand internal states developed in a consumer through product design and implies its need while developing strategies for marketing a product.

This study possesses some limitations too. It reflects the internal states from product design only (stimulus) hence other characteristics of a product that contribute to cognition affect are not examined. Another limitation of this study is that it inspects internal states that is cognition and affect as a whole. Consequently, there arises a need for focusing on the different types of cognition and affective states such as emotions, arousal and pleasure separately. This study particularly focuses on semi-durable products and findings may not be applicable to other types of products.

The research model was developed from S-O-R Framework. This research model can be extended by adopting dimensions from other models. Future research could investigate cognition and affective states in detail. Product attitude was found to have an influence on purchase intention. Empirical work that includes behavioural outcome measures (e.g., choice, purchase) can be focused which may be useful to help insights for managers to know the actual behaviour of consumers and to increase sales of a product. Product design is contributing immensely to the success of the product hence multi-dimensional research on the basis of durability of the products would be an interesting topic for young researchers to set their foot onto.

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Appendix: Measurement Scales

Measures	Item Acronym	Mean	SD
Product Design			
I like the new products options offered by manufactures	PD1	4.59	.658
I wait until a new innovation has proven itself before purchasing	PD2	4.34	.847
I prefer to buy new products of brands familiar to me	PD3	4.40	.771
I like to tell others about new products	PD4	4.39	.832
Economic conditions make me more likely to try new products	PD5	4.26	.973
Brand Familiarity			
I purchase the products of only familiar brands	BF1	4.28	.855
I believe it is important to know the brand	BF2	4.44	.806
I have found that knowing about brand make difference in purchase	BF3	4.44	.800
I have used various branded product	BF4	4.46	.783
Product Attitude			
I intended to purchase products even if they are more expensive	PA1	4.01	1.157
I think quality is an important criteria when buying products	PA2	4.65	.626
I spend sufficient time to get a quality product	PA3	4.52	.735

Contd...

I think gender is a factor that has effect on the purchase decision	PA4	4.29	.893
Affect			
I often feel anxious about making purchase	A1	4.32	.879
When I think about making purchase I become excited	A2	4.30	.845
I sometimes feel that something from my inner mind pushed me to make a purchase	A3	4.24	.950
I will continue to buy the products of my favourite brand	A4	4.43	.844
Cognition			
I think knowledge can motivate my purchasing process	C1	4.53	.624
I think effect of peer group induce me to buy	C2	4.34	.903
Advices & information provided by my family may lead to buying decision	C3	4.33	.902
I think advertisement can change my perception about the product	C4	4.14	1.055
I think knowing about sales promotions schemes make difference in purchase	C5	4.33	.908
I believe cash discount is the good option as a sales promotion scheme	C6	4.45	.889
Purchase intention			
I will buy a product based on the advertisement	PI1	4.00	1.093
I will purchase a product based on its attractiveness	PI2	4.24	.970
I always prefer high quality products	PI3	4.53	.760
I definitely intend to buy branded products	PI4	4.31	.912
I prefer to purchase branded products next time	PI5	4.38	.882

Source: Primary Data

Rotated Component Matrix

Item Acronym	Components					
	1	2	3	4	5	6
PD1	.622					
PD2	.501					
PD3	.552					
PD4	.613					
PD5	.697					
BF1		.748				
BF2		.720				
BF3		.617				
BF4		.597				
PA1			.522			
PA2			.688			
PA3			.704			
PA4			.509			
A1				.702		
A2				.766		
A3				.689		
A4				.648		
C1					.502	
C2					.583	
C3					.621	
C4					.635	
C5					.616	
C6					.732	
PI 1						.699
PI 2						.696
PI 3						.666
PI 4						.621
PI 5						.714

Extraction Method: Principal Component Analysis

Rotation Method: Varimax

Source: SPSS calculation

Role of Demographics in Pro-Environmental Search Behaviour

Prof. Nittala Rajyalakshmi

ABSTRACT

Consumers' search is an ongoing process for internal and external information to identify and purchase green products. The environmental information requirement of the consumer depends on the demographic variables, i.e., gender, age, marital status, education, occupation and income of the consumer. Searching for eco-products facilitates purchase of green products and helps in achieving objective of protecting and preserving the mother earth. Consumers have to engage genuinely in green search, otherwise they cannot adopt green consumption behaviour.

This study aims to examine the influence of demographic variables on pro-environmental search behavior. The data is analyzed using descriptive statistics and MANOVA. The findings reveal the significant positive influence of age, gender, education, occupation and monthly income on search behaviour but marital status has no influence. The findings are useful for green marketers for demographic segmentation and to design and target the consumers with green messages.

Keywords: *Demographic variables, Pro-environmental search, Green consumer behaviour, Environmental information.*

Introduction

The decreased quality of environment and depletion of natural resources as a result of human actions increase the significance of the participation of all the stakeholders namely, consumers, governments, organizations, companies and media in protecting the environment. This requires population with environmental education, the spirit of worry for the environment and the inspiration for enthusiastically contributing to environmental development and safeguard. White et al. (2019) defined sustainable consumer behaviour as reduced use of natural resources and adverse environmental impacts throughout the lifecycle of the product, behaviour, or service. This includes information search, decision making, product or behaviour adoption, product usage, and disposal to reduce the impact on the environment. Green consumer behaviour deserves less consumption (McDonald et al. 2006); selecting

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environmentally friendly products with green production and features (Luchs et.al., 2012; Pickett-Baker and Ozaki 2008); conserving natural resource and products while consumption (Lin and Chang 2012; White et al., 2014); and opting for environment-friendly disposal (White and Simpson 2013). The demographic profiles of consumers are important (Singhal and Malik, 2018) and significant relationship is observed between demographics and green consumer behaviour (Gifford and Nilsson 2014; Diamantopoulos et al. 2003). The age, gender, occupation, income, education and marital status are the demographic variables that influence green consumer behaviour. Gender differences observed because women display more amicability, interdependence, and ready to new experience (Dietz et al., 2002; Eagly 2009; Luchs and Mooradian 2012). Some studies noticed green consumer behaviour among younger, more liberal, and highly educated consumers (Gilg et.al. 2005; Semenza et al. 2008). Segments with environmental concern can be targeted with green messages (Laroche et al., 2001), and interferences should be customised to reflect the definite requirements and drives, obstacles, and value of the target segment (Abrahamse et al. 2007; Balderjahn et al. 2018; Daamen et al. 2001).

Consumers' search for internal and external information to identify and purchase green products is an ongoing process. This requires some investment, vigour, money and frequently requires surrendering personal likes (Hawkins et al., 2005). The environmental information requirement of the consumer depends on the demographic variables, i.e., gender, age, marital status, education, occupation and income of the consumer. Searching for eco-products facilitates the purchase of green products and helps in achieving the objective of protecting and preserving the mother earth. Consumers have to engage genuinely in green search; otherwise, they cannot adopt green consumption behaviour. Hence this study examines the influence of demographic variable on pro-environmental search behaviour.

Literature Review

Young consumers changed their consumption patterns with growing awareness of the implications of environmental problems (Adnan et al., 2017; Kautish and Sharma, 2019). Environmental changes have no age discrimination and affect everyone. But young people face challenges for a longer period because of their life span (Naderi and Steenburg, 2018). The youth share green information (Allen and Spialek, 2018; Prakash et al., 2018), conscientious consumption (Agrawal and Gupta, 2018) and promotes a positive change for climate improvement and adaptation (Quoquab et al., 2019; United Nations, 2018). The younger generation is more willing to buy green products (Uddin and Khan, 2018).

Kaman Lee (2009) observed in Hong Kong, that female adolescents' scored low on self-identity in ecological safety, compared to the male adolescents but male adolescents scored significantly lower than the female adolescents in perceived environmental problems and responsibility and environmental attitude and concern. Tikka et al. (2000) have evidenced a more positive attitude towards the environment among females than males. A few studies have identified a negative association between gender and ecological knowledge (Diamantopoulos et al., 2003) but some studies report males to dominate the females in environmental knowledge (Kristensen and Grunert, 1994) because males are more exposed to environmental information than females. Women are on par with men in the level of environmental awareness, but in perceived environmental responsibility and recycling behaviour they outperform men (Paço and Rodrigues, 2016; Lee and Cho, 2019). Women are found to be bypassing males concerning repeat purchases and the ability to look for naturally well-disposed items (Jain and Kaur, 2006). Females'

sustainable consumption behaviour was higher in overall behaviour and inclination to use products again (Bulut et al. 2017). Women believe others and it influences their purchase decision. If faith in government and marketers is infused among women, they will become proxies and change the environmental sustainability scene. Sustainability mindedness is not equal among all women (D'Souza and Taghian, 2017).

Many studies reported a significant relationship between education and environmental consciousness. Education and ecological concerns and conduct are expected to be positively related (Kohut and Shriver 1989). Education level was negative but significantly related to the willingness to adopt green purchase behaviour (Jain and Kaur 2006; Nittala, 2014). Educated people put more efforts into reuse and recycling activities and education decides the sustainable use of products (Scott and Willits, 1994). Generally, higher-income persons can afford and purchase green products at a premium price and income is related to environmental consciousness (Straughan and Roberts, 1999). High-income persons are rich in their rate of information search behaviour and obtaining environment-friendly products (Jain and Kaur 2006). Very few studies identified an insignificant relationship between income and ecological information (Buttall and Flinn, 1978). Income is positively related to recycling behaviours as the higher income reflects in higher recycling effort (Derksen and Gartrell, 1993).

The occupation was associated with ecological cognizance in past studies (Chan, 2000). Several studies have examined the relationship between occupation and environmental consciousness, but the findings are not conclusive to draw any clear inference. Buttall and Flinn (1978) observed an insignificant relationship between occupation and environmental knowledge. Jain and Kaur (2006) identified higher ecological consciousness among general service class persons, housewives and/or experts. A similar observation shows that social and occupational status is positively related to maximum effort in the reuse of objects (Corral- Verdugo and Zaragoza, 2000).

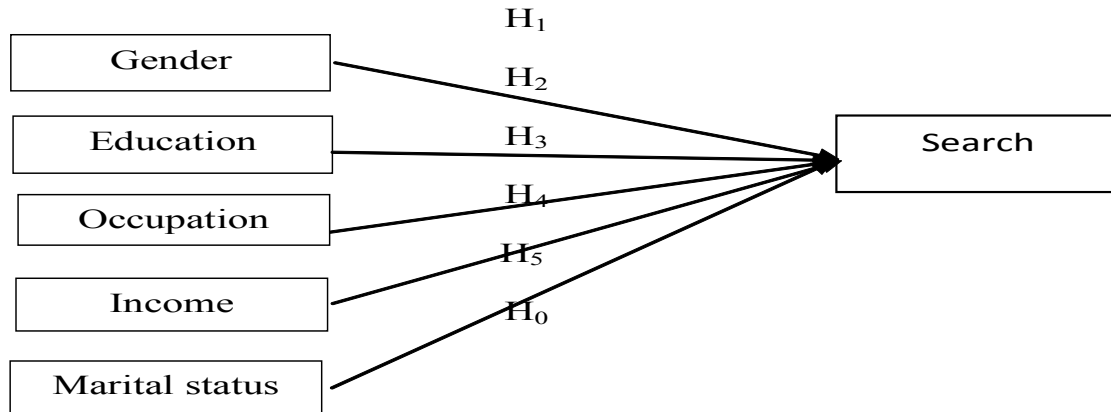
Marriage changes the household life cycle. Household responsibilities are shared and combined decision making gives novel experiences (Raymond, 2000). Many married households are double income group and relatively affluent. When they have extended family with children, spouse and children influence their green behaviour.

The association between demographic variables and environmental concern was focused in several studies but studies on the influence of demographic variables on pro-environmental search are very scarce. Hence, to fill this gap, this study examines the influence of demographic variables on pro-environmental search behaviour.

Research Model and Hypothesis

The literature on demographic variables and environmental concern in consumption is very limited and especially no studies are available on environmental concern and search behaviour. Based on previous research the following research model and hypotheses are proposed.

Fig. 1 Proposed Research Model



H₁: Age has a significant positive influence on pro-environmental search behaviour.

H₂: Gender has a significant positive influence on pro-environmental search behaviour.

H₃: Education has a significant positive influence on pro-environmental search behaviour.

H₄: Occupation has a significant positive influence on pro-environmental search behaviour.

H₅: Income has a significant positive influence on pro-environmental search behaviour.

H₀: Marital status has no influence on pro-environmental search behaviour.

Methods

Participants

The respondents are selected from Visakhapatnam city, Andhra Pradesh, India. There are 66 urban wards in Visakhapatnam City and ten respondents from each urban ward were selected using Quota sampling method. The total sample size is 660.

Data Collection

The data were collected by self administered questionnaires. The questionnaire was prepared by collecting statement from previous studies and some statements were developed for this study. The questionnaire consisted of 6 demographic questions and 11 statements about search behaviour. Demographic questions are categorical and search behaviour statements were measured on 5 point scale (1 strongly disagree to 5 strongly agree). The three items, "I search for products those give more savings than environmental friendliness", "It requires too much time & effort to find the green product" and "Most of the environmental claims made on the package labels or in advertising are false and/or confusing" are reverse scaled.

Data Analysis

Descriptive statistics are used to present the demographic profile of the respondents. MANOVA (Multi-Variate Analysis of Variance) is used to analyze the influence of demographic variables on search variables and to test the hypotheses.

Results

Demographic profile of the respondents is presented in table 1. Majority of the respondents, 192(29%) are in the age group of 26-35 years and only 38 (5.8%) are in 56 & above age group. Female respondents are 352 (53.3%) and males are 308 (46.7%). Majority of them are graduates (36.1%) followed by postgraduates, Inter, SSC and others. Occupation of the respondents reveals that the majority of them are employees (52.1%) followed by students, unemployed, homemakers, business people and retired. Considering the income level, 48% of them get < Rs. 25000, 19.5% get Rs. 25,001- 50,000, 13.2% get > Rs.1, 00,000, 10% get Rs.75, 001- 1, 00,000 and 9.2% of them get Rs. 50, 001- 75,000. A majority (67.7%) of them is married and 31.4% are unmarried. This shows that the majority of the respondents are in the age group of 26-35 years, females, graduates, employed, earning less than < Rs. 25000 per month and married.

Table1 Demographic Profile of the Respondents

Demographics	No of respondents	Percentage
Age		
18-25 Years	175	26.5
26-35 Years	192	29.1
36-45 Years	148	22.4
46 - 55Years	107	16.2
56& above	38	5.8
Gender		
Male	308	46.7
Female	352	53.3
Education		
SSC	76	11.5
Inter	99	15.0
Graduate	238	36.1
Postgraduate	208	31.5
Others	39	5.9
Occupation		
Employed	344	52.1
Unemployed	54	10.5
Own Business	69	8.2
Student	101	15.3
Home maker	68	10.3
Retired	24	3.6
Monthly Income (in Rs)		
< 25,000	317	48.0
25,001- 50,000	129	19.5
50, 001- 75,000	61	9.2
75,001-1,00,000	66	10.0
>1,00,000	87	13.2
Marital Status		
Married	447	67.7
Un-Married	207	31.4
Others	6	.9

The MANOVA (Multi-Variate Analysis of Variance) is used to analyze the data of demographic variables each as a fixed or independent variable and pro-environmental search variable as dependent variables. Table 2 presents the result of multivariate tests for demographic variables and pro-environmental search variables. There was a significant variance in green search behaviour based on consumer's age, $F(44, 2470) = 2.283, p < .0005$; Wilk's $\Lambda = .859$, partial $\eta^2 = .037$. Therefore, we can conclude that green search behaviour was significantly dependent on the age of the consumer ($p < .0005$). There was a significant variance in green search behaviour based on consumer's Gender, $F(11, 648) = 1.935, p < .0005$; Wilk's $\Lambda = 0.968$, partial $\eta^2 = .03$. Therefore, we can conclude that green search behaviour was significantly dependent on the gender of the consumer ($p < .0005$). There was a significant variance in green search behaviour based on consumer's Education, $F(11, 648) = 2.321, p < .0005$; Wilk's $\Lambda = 0.856$, partial $\eta^2 = .038$. Therefore, we can conclude that green search behaviour was significantly dependent on the education level of the consumers ($p < .0005$). There was a significant variance in green search behaviour based on consumer's Occupation, $F(55, 2985) = 2.282, p < .0005$; Wilk's $\Lambda = 0.826$, partial $\eta^2 = .037$. Therefore, we can conclude that green search behaviour was significantly dependent on the occupation of the consumers ($p < .0005$). There was a significant variance in green search behaviour based on consumer's Monthly Income, $F(44, 2470) = 3.088, p < .0005$; Wilk's $\Lambda = 0.815$, partial $\eta^2 = .050$. Therefore, we can conclude that green search behaviour was significantly dependent on the monthly income of the consumers ($p < .0005$). There was no significant variance in green search behaviour based on consumer's marital Status, $F(11, 648) = .846, p > .05$; Wilk's $\Lambda = 0.972$, partial $\eta^2 = .014$. However, as Marital Status shows no significance we will not continue with further tests.

It can be concluded that pro-environmental search depends on age, gender, education, occupation and monthly income but not dependent on marital status. This supports all hypotheses (H_1, H_2, H_3, H_4, H_5 and H_0) and they are all accepted.

Table 2 Multivariate Tests of Demographics and pro-environmental search variables - Wilks' Lambda

Effect	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Age	.859	2.283	44.000	2469.563	.000	.037
Gender	.968	1.935	11.000	648.000	.032	.032
Education	.856	2.321	44.000	2469.563	.000	.038
Occupation	.826	2.282	55.000	2984.516	.000	.037
Monthly income	.815	3.088	44	2469.563	.000	.050
Marital status	.972	.846	22.000	1294	.669	.014

Table 3 shows how the green search variables differ for the demographic variables; age, gender, education, occupation, and income. Age, education, occupation and monthly income influence the perception of the consumers about claims made by the green marketers. This shows that irrespective of the difference in age, education, occupation and the monthly income they all perceive that the environmental claims made by the marketers are misleading. Gender, Education, occupation and monthly income influence “I search for green products” indicating that there is no difference in searching for green products among different groups in gender, education, occupation and monthly income. Education and occupation influence believe in eco-friendly advertising and rely on products which are having environmental certifications. Age, education, and monthly income influence search for energy-efficient products and appliances. Education and occupation influence consumers’ acceptance of friends/family opinion on green goods. Education and income influence consideration of the environmental aspects of the products while searching.

**Table 3 Green Search Variables Differ for the Demographic Variables
(Tests of Between-Subjects Effects)**

Demographics	Green search variable	F	sig
Age	I search for energy efficient product and appliances	3.22	.012
	It requires too much time & effort to find green product	5.808	.000
	Most of the environmental claims made on the package labels or in advertising are false and/or confusing	6.022	.000
	I rely on products which are having environmental certifications	3.704	.005
Gender	I hear and pay attention to my friends/family opinion concerning green products	10.812	.001
	I believe in eco-friendly advertising	4.672	.031
	I rely on products which are having environmental certifications	5.254	.022
	I search for green products	6.980	.008
Education	I search for energy efficient product and appliances	2.590	.036
	I consider the environmental aspects of the products while searching	2.415	.048
	I hear and pay attention to my friends/family opinion concerning green products	4.399	.002
	I believe in eco-friendly advertising	6.120	.000
	Most of the environmental claims made on the package labels or in a advertising are false and/or confusing	5.696	.000
	I rely on products which are having environmental certifications	5.964	.000
	I search for green products.	5.029	.001

Occupation	I hear and pay attention to my friends/family opinion concerning green products	12.323	.000
	I believe in eco-friendly advertising	2.709	.020
	I take help of retail staff to get information regarding the green product	5.180	.000
	Most of the environmental claims made on the package labels or in a advertising are false and/or confusing	5.626	.000
	I rely on products which are having environmental certifications	4.067	.001
	I search for green products	7.551	.000
Income	I search for products those give more savings than environmental friendliness	4.211	.002
	I search for energy efficient product and appliances	4.473	.001
	I consider the environmental aspects of the products while searching	10.164	.000
	It requires too much time & effort to find green product	13.166	.000
	Most of the environmental claims made on the package labels or in a advertising are false and/or confusing	2.609	.035
	I search for green products	3.683	.006

Multiple Comparisons

Multiple Comparisons of age shows that mean scores for “I search for energy-efficient products and appliances” are significantly different between 18-25 Years and 56 & above ($p < .05$), and 36-45 Years and 56 & above ($p < .05$). Mean scores for “It requires too much time & effort to find the green product” are significantly different between 18-25 Years and 46-55 Years ($p < .0005$), 26-35 Years, and 46-55 Years ($p = .0005$) and 36-45 Years and 46-55 Years ($p < .05$). Mean scores of many environmental claims made by the marketers are misleading, are significantly different between 18-25 Years and 26-35 Years ($p < .005$), 18-25 Years and 46-55 Years ($p < .005$) and 26-35 Years and 36-45 Years ($p < .05$) and 36-45 Years and 46-55 Years ($p < .05$). Mean scores of “I rely on products which are having environmental certifications” are significantly different between 18-25 Years and 36-45 Years ($p < .05$) and 18-25 Years and 56 & above ($p < .05$).

Multiple Comparisons of education show that the mean score for considering friends/ family opinion on green products is significantly different between Post Graduate and SSC ($p < .005$) and Graduate ($p < .05$). Mean scores for I believe in eco-friendly advertising are statistically significantly different between Post Graduate and SSC ($p < .05$), Inter ($p < .005$) and Graduate ($p < .005$). Consumers consider many environmental claims made by the marketers are misleading and mean scores are significantly different between Post Graduate and SSC ($p < .005$), Inter ($p < .05$) and Graduate ($p < .05$). Mean scores of I rely on products which are having environmental certifications are significantly different between Post

Graduate and SSC ($p < .05$), Inter ($p < .05$) and graduate ($p < .0005$), and I search for green products are significantly different between Post Graduate and SSC ($p < .05$) and Inter ($p < .005$).

Multiple Comparisons of occupation show that mean scores for consumers considering their friends/family opinion on green products are significantly different between employee and business ($p < .0005$), unemployed ($p < .0005$) and homemaker ($p < .0005$), business and student ($p < .005$), unemployed and student ($p < .005$) and homemaker and student ($p < .005$). Mean scores for I take the help of retail staff to get information regarding the green product are significantly different between Employee and Business ($p < .005$) and Home Maker ($p < .05$). Mean scores for many environmental claims made by the marketers are misleading are significantly different between Employee and Business ($p < .005$) and Student ($p < .05$). Mean scores of I rely on products which are having environmental certifications are significantly different between Employee and Home Maker ($p < .05$), and retired ($p < .05$) and I search for green products are significantly different between Employee and Business ($p < .0005$), Home Maker ($p < .005$), Retired ($p < .05$), Business and Student ($p < .05$),

Multiple Comparisons of income show that mean scores for I search for products that give more savings than environmental friendliness are significantly different between $< \text{Rs}25,000$ and $> \text{Rs}.100,000$ income groups ($p < .005$). Mean scores for I search for energy-efficient products and appliances are significantly different between $< \text{Rs}25,000$ and $\text{Rs}.75001 - \text{Rs}.100,000$ income groups ($p < .005$) and $\text{Rs}.75001 - \text{Rs}.100,000$ and $> \text{Rs}.100,000$ ($p < .005$). Mean scores for I consider the environmental aspects of the products while searching are significantly different between $< \text{Rs}25,000$ and $\text{Rs}.50,001 - \text{Rs}.75,000$ income groups ($p < .05$), $\text{Rs}.75001 - \text{Rs}.100,000$. ($p < .0005$), and $> \text{Rs}.100,000$ ($p < .005$) and $\text{Rs}.25,001 - \text{Rs}.50,000$ and $\text{Rs}.75001 - \text{Rs}.100,000$ ($p < .05$).

Discussion

Demographics influence the pro-environmental search behaviour as age, gender, level of education, occupation and monthly income influence the green search behaviour but marital status has no influence. This finding is useful for the demographic segmentation of green consumers. Irrespective of differences in age, education, occupation and the monthly income they all perceive that the environmental claims made by the marketers are misleading. Green marketers have to be very careful in providing reliable information on product labels and in advertisements. There is no difference in searching for green products among different groups in gender, education, occupation and monthly income. Marketers have to target these groups with environmental information about the products. Education and occupation groups believe in eco-friendly advertising and rely on products which are having environmental certifications. Eco-friendly advertisements can be targeted towards educated and employed segments and eco-labels are important to attract this group. All the groups in age, education and monthly income do search for energy-efficient products and appliances. Green marketers have to promote the energy efficiency of their products to attract these segments. Education and occupation groups give importance to the belief of friends/family regarding green products. Marketers can target reference groups and opinion leaders. Education and monthly Income groups consider the environmental aspects of the products while searching.

Education, occupation and income are important demographic variable for which more search variables differ. Educated consumers are more concerned about the environment and they search and purchase green products. Occupation also plays an important role in promoting green search behaviour.

Consumers with different occupation behave differently in searching for green products. Some consumers may seek opinion of their friends/family, some may believe in eco-advertising and other may take help of retail staff to get information of green products. Income plays a major role in pro environmental search, as high income people prefer to purchase green products because general view is that green products are expensive. Educated consumers with good occupation and income is an attractive segment for green products.

Conclusion

Green consumer behaviour is the need of the hour to protect the earth from environmental damage and pollution. Search is the basic step in consumer behaviour and environmental concern should start here. Demographic profile of the consumer also plays a major role in adapting green

search behaviour. Depending on their age consumers feel concern for the environment. As several studies identified females have more concern for environment than males. Green search behaviour also depends on education, occupation and income. Green marketer can use this information for demographic segmentation of information seeking green consumers to help them in pro-environmental search and to encourage purchase of green products.

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Sukanya Samridhhi Scheme: A Case Discussion

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ABSTRACT

Sukanya Samridhhi Scheme is matchless scheme for female child whose is below 10 years. Broadly, it can be said that it is best scheme especially for those parents who do not have Government Provident Fund (GPF), Statutory Provident Fund (SPF), Employees Provident Fund (EPF), Public Provident Fund (PPF) or Recognized Provident Fund (PPF) as amount deposited in this account qualifies for deduction U/S 80 C of the Income Tax Act, 1961. The Case has an attempt of performance of Sukanya Samridhhi Scheme in coming years.

Keywords: Scheme, GPF, SPF, EPF and PPF

Introduction

Sukanya samridhhi scheme is unique small savings scheme meant only for female child up to age of 10 years. In this scheme maximum interest (0.5% more than ppf) is paid by the government. One can deposit between Rs. 250 to 150000 in a financial year for 14 consecutive years and will receive rs.10571 (Principal amount = Rs.3500) to 6342589 (Principal amount = 2100000) respectively as maturity value after 21 years, calculated 7.6% interest per annum. Primary motive of opening this account is to create provisions for higher education or marriage of the daughter. In brief it can be said that prosperous daughter is future of the country.

The basic assumptions are followed in Sukanya Samridhhi scheme. (a) Interest is paid on monthly product and compounded yearly, (b) interest rate is fixed for the entire period (up to 21 years), (c) contribution is made before 10th of April each year in yearly mode and before 10th of each month in monthly mode, and (d) contribution taken for calculation might not be in multiple of Rs.100. Sukanya Samridhhi scheme is a government backed scheme as part of the “*Beti Bachao, Beti Padhao Yojna*” for the benefit of the female child. Prime Minister of India Honourable Narendra Modi’s approach is that, if daughters will be prosperous then automatically our country will be prosperous hence, it is also said happiness is there where daughter is. In order to provide security to them the Government, via notification no. G. S. R. 863 (e) dated December 2, 2014, has notified the Sukanya Samridhhi account rules, 2014, which came into force with effect from the same day which is known as Sukanya Samridhhi scheme. The objective of this paper is to inform and motivate the parents of female child to creat fund for future that would be helpful for her higher education or marriage purpose.

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The following are features of Sukanya Samridhi account such as (a) Account may be opened by the parents (Mother/father) or legal guardian, if no parents are alive till the age of 10 years of the daughter. (b)The account can be opened in Head Post Office or selection grade sub post office or in any branch of State Bank of India (Excluding offices managed by single officer or clerk) and also at specified branches of other nationalized banks. (c) Only one account can be opened by the parent or legal guardian of female baby in the name of daughter either in Bank or in Post office in India. Another account may be opened in the name of Second daughter, but number of such accounts in a family should not be more than two. There might be three accounts in following circumstances but that should be supported by medical proof: (a) If triplets female baby born at the time of first delivery, or (b) If twins female baby born at the time of second delivery. The Documents Required For Opening Account such as Birth Certificate of Daughter, (b) Identity Proof of Parents/ Guardian, (c) Two Photograph of Parents/ Guardian & Daughter, (d) Address Proof of Parents/ Guardian

Rules Regarding Deposit in the Scheme

In starting for opening SSS minimum amount required was Rs.1000 but w. e. f. 23rd of July, 2018 it slashed down to Rs.250 only but maximum ceiling remains unchanged. Contribution can be made any time during the Financial Year between Rs.250 to 150000 in the multiple of Rs.100 up to 14 years from the year of opening of the account through cash, cheque/demand draft/ RTGS/ or any electronic mode. However, no contribution is to be made from 15 years onwards but, account will earn interest and will continue up to 21 years or up to the marriage of daughter whichever is earlier.

Rules Regarding Withdrawal Facility

The account will remain operative for 21 years from the date of its opening or till the marriage of the girl after she turns 18. To meet the financial requirements of the account holder for the purpose of higher education (Documentary proof in the form of offer of the confirmed admission in an educational institution or a fee slip from such institution clarifying that such financial requirement, is required. Further, the withdrawal amount will be restricted to the actual demand of fee and other charges required at the time of admission as shown in the offer of admission or the relevant fee slip issued by the institution) and marriage, withdrawal of up to 50 per cent of the balance at the credit of the account at the end of preceding financial year is allowed moreover, if marriage take place before completion of 21 years, the operation of the account will not be permitted beyond the date of her marriage. If account is closed before the completion of 21 years, the account holder will have to give an affidavit to the effect that she is not below 18 as on the date of closing of account. On maturity, the balance, including the interest outstanding in the account, will be payable to the account holder on the production of withdrawal slip along with the passbook.

Rules Regarding Rate of Interest

Rate of interest on this account is determined every year in the Budget. From January, 2016 Government fixes rate of interest on quarterly basis based on the yields on government securities. Interest notified by the government is compounded yearly and credited to the relevant account. Following table shows rate of interest in various quarter of the years are as follows:

Table:1: stated the rate of Interest since Inception

Financial Year	April - June	July - September	October - December	January - March
2014-2015	X	X	X	9.2
2015-2016	9.2	9.2	9.2	9.2
2016-2017	8.6	8.6	8.6	8.5
2017-2018	8.4	8.3	8.3	8.1
2018-2019	8.1	8.1	8.5	8.5
2019-2020	8.5	8.4	8.4	8.4
2020-2021	7.6	7.6	7.6	7.6

Source: Budget of various year

It is evident from table 1 that interest rate is continuously decreasing since its inception and decreased from 9.2% (2014-15) to 7.6% (2020-21).

Rules Regarding Transfer/ Contribution

Account can be transferred from one branch of Post Office/Bank to another branch of Post office/ Bank or from Bank to Post office or vice versa and non-transferrable among two daughters. Contribution made in the account qualifies for Deduction U/S 80C of the Income Tax Act, 1961 along with other deposits maximum up to Rs.150000. Interest credited; Withdrawal/Maturity value is also exempted. This investment is based on EEE concept. Nomination facility is not available under this scheme. Account cannot be opened in the name of an NRI girl. A girl child is eligible for an SSY account only if she is a resident Indian citizen when the account is opened, and remains so until the maturity or the closure of account. no interest shall be paid from the date of citizenship or residential status changes and the account will be considered closed. Each year contribution of Rs.250 is to be made; if it is not made in one or more years then it can be revived latter on by paying penalty of Rs.50 per year along with minimum contribution. If the penalty is not paid, the entire deposit, including those made before the date of default, will receive interest rate applicable (at that time) at post office savings bank account. In case excess interest has been paid it will be reversed.

Rules Regarding Closer of Account

Account may be closed after completion of 21 years from the financial year in which account was opened. In the event of death of the female child, the account will be closed immediately on the production of a death certificate issued by the competent authority and the balance in the account will be paid, along with the interest till the month preceding the month of the premature closure of the account to the guardian. In any other case, a request for the premature closure of an SSS account can be

put forward after the completion of five years of the account opening and will be allowed as per rules, on extreme compassionate grounds such as is suffering from any life – threatening disease which require heavy amount for treatment or due to marriage of the daughter before 21 years, in such cases the entire deposit will get interest of Post Office Savings Bank account.

Depositor is given a passbook bearing the date of birth of the girl child, date of opening of the account, account number, name and address of the account holder and the amount deposited. The passbook will be presented to the post office or bank at the time of depositing money, withdrawal, final closure and on maturity of the account. For understanding the miracle of the interest properly author has prepared several tables taking various rate of interest largely due to the fact it is continuously decreasing. If any person deposits any amount regularly then it will increase rapidly. In order to determine by a parent that how much he should deposit monthly/ yearly under this scheme in order to get desired amount at the time of marriage/ higher education of his female child following tables has been elaborated for wider understanding. As rate of interest is continuously decreasing, we have presented a couple of table with various rate of interest based on certain assumption taken in the starting of the paper.

Table- 2 stated the Statement showing maturity value of Sukanya Samriddhi Scheme At “contribution of Rs.250 per annum” @ 7.6%.

S. No.	Year	Opening Balance	Contribution during the year	Interest for the year	Closing balance
1	2020-21	0.00	250	19.00	269.00
2	2021-22	269.00	250	39.44	558.44
3	2022-23	558.44	250	61.44	869.89
4	2024-25	869.89	250	85.11	1205.00
5	2025-26	1205.00	250	110.58	1565.58
6	2026-27	1565.58	250	137.98	1953.56
7	2027-28	1953.56	250	167.47	2371.03
8	2028-29	2371.03	250	199.20	2820.23
9	2029-30	2820.23	250	233.34	3303.57
10	2030-31	3303.57	250	270.07	3823.64
11	2031-32	3823.64	250	309.60	4383.23
12	2032-33	4383.23	250	352.13	4985.36
13	2033-34	4985.36	250	397.89	5633.25
14	2034-35	5633.25	250	447.13	6330.37
15	2035-36	6330.37	0	481.11	6811.48
16	2036-37	6811.48	0	517.67	7329.16
17	2037-38	7329.16	0	557.02	7886.17
18	2038-39	7886.17	0	599.35	8485.52
19	2039-40	8485.52	0	644.90	9130.42
20	2040-41	9130.42	0	693.91	9824.33
21	2041-42	9824.33	0	746.65	10570.98

It is evident from above table (Table 3) if an investor invests only Rs.250 per year which is less than one rupee per day for 14 years only, the maturity value will be Rs.10571 when daughter's age will be 21 years. It is also clear from the table that she is entitled to take withdrawal of Rs. 3943 in 18th year i.e., .F. Y 2038-2039 if required for some specific purposes. Investor will receive more than Rs.7000 as interest on the above deposit which will be fully exempted in the hands of investors at the same time he will get deduction U/S 80C of the Income Tax Act, 1961 too.

Summary and Conclusion

Sukanya Samriddhi Scheme is matchless scheme for female child whose is below 10 years. Broadly, it can be said that it is best scheme especially for those parents who do not have Government Provident Fund (GPF), Statutory Provident Fund (SPF), Employees Provident Fund (EPF), Public Provident Fund (PPF) or Recognized Provident Fund (RPF) as amount deposited in this account qualifies for deduction U/S 80 C of the Income Tax Act, 1961, in addition to benefits mention above. It is also pertinent to mention here that as per previous records rate of interest in this scheme use to be 0.5% more than PPF. For a person having conservative to moderate approach it is best scheme. Of course rate of return like mutual funds and shares is not lucrative, but considering safety, profitability & taxation it is best scheme. Even if, you are not interested in fixed interest bearing securities, it may be suggested that have diversification in your investment and certainly open Sukanya Samriddhi Account if you are a parent of a female child of age below 10 years.

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27	2007	P.G. Department of Commerce Utkal University, Bhubaneswar	Prof (Dr) Samson Moharana Professor Utkal University, Bhubaneswar	Prof. Kishore Ch. Rout, Berhampur University	Prof. Jagannath Panda, Berhampur University	One Issue
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29	2009	Govt. Autonomous College, Angul	Maj (Dr.) Abhay Kumar Panda, Principal, Fakir Mohan Autonomous College, Balasore.	Prof. Kishore Ch. Rout, Berhampur University	Prof. Ranjan Kumar Bal, Utkal University	One Issue
30	2010	Department of Commerce, Ravenshaw University	Shri Baladev Kar, Principal, Govt. College (Auto), Angul	Dr. Kshiti Bhusan Das, Utkal University	Prof. Ranjan Kumar Bal, Utkal University	One Issue

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31	2011	P. G. Department of Commerce, Berhampur University	Prof. Malay Kumar Mohanty, Former Registrar, Ravenshaw University, Professor G. M. College, Dean Sambalpur University	Dr. Kshiti Bhusan Das, Utkal University	Prof. Ranjan Kumar Bal, Utkal University	One Issue
32	2012	P. G. Department of Commerce, Utkal University	Prof. P. K. Biswasray, Professor, Berhampur University	Dr. Kshiti Bhusan Das, Utkal University	Prof. Ranjan Kumar Bal, Utkal University	One Issue
33	2013	Choudwar College, Choudwar	Prof. Prasant Kumar Sahu, Vice-Chancellor, Utkal University	Prof. Kshiti Bhusan Das, Utkal University	Prof. Malay Kumar Mohanty	One Issue
34	2014	P. N. (Auto) College, Khurda	Prof. Ranjan Kumar Bal, Professor, Utkal University	Prof. Kshiti Bhusan Das, Utkal University	Prof. Malay Kumar Mohanty	Two Issue
35	2014-15	Kendrapada (Auto) College	Prof. Kshiti Bhusan Das, Professor, Utkal University	Dr. G. K. Panigrahi	Prof. Malay Kumar Mohanty	Two Issues
36	2016	Belpahar College, Belpahar	Prof. Girish Ku. Patra, Kendrapada (Auto) College	Dr. G. K. Panigrahi	Prof. Malay Kumar Mohanty	Two Issues
37	2017	F. M. University, Balasore	Prof. Jayanta Kumar Parida, Professor, Utkal University	Dr. G. K. Panigrahi	Prof. Malay Kumar Mohanty	Three Issues
38	2018	Ravenshaw University, Cuttack	Prof. Bhagaban Das, Professor, F. M. University	Major (Dr) S. A. Taher	Prof. Malay Kumar Mohanty	Four Issues
39	2019	P. G. Department of Commerce, Utkal University	Prof. Sanjay Kumar Satapathy, Professor, Ravenshaw University	Major (Dr) S. A. Taher	Prof. Malay Kumar Mohanty	Four Issues
40	2019-20	KIIT, Deemed to be University,	Prof. P. K. Hota,	Major (Dr) S. A. Taher	Prof. Malay Kumar Mohanty	Four Issues
41	2020-21	L.N.College, Jharsuguda	Prof.Sasmita Samanta, Pro-Vice Chancellor, KIIT University, Bhubaneswar	Major (Dr) S. A. Taher	Prof. Malay Kumar Mohanty	Two Issues

* **Information not available:** People concerned are requested to provide the above missing information with proper references. If any error has crept in the above incumbency chart inadvertently, persons are requested to intimate the correction with the required documentation.

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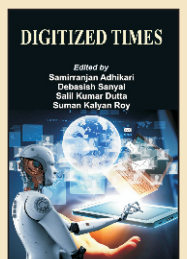
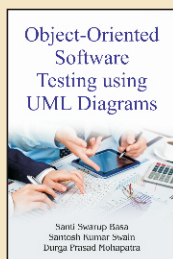
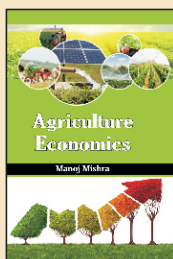
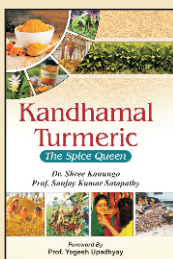
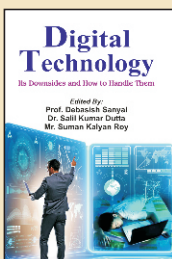
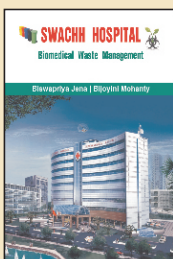
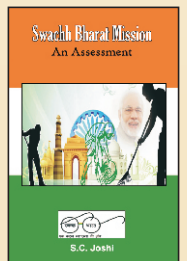
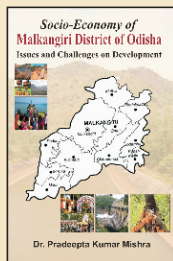
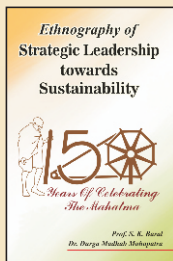
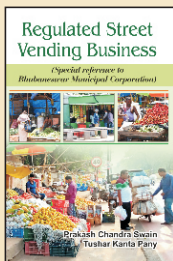
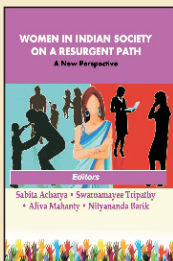
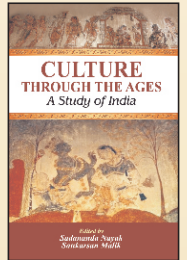
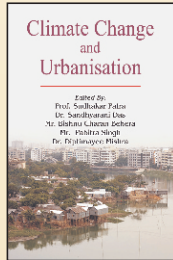
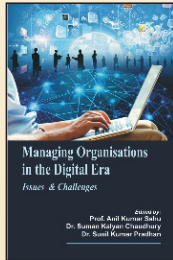
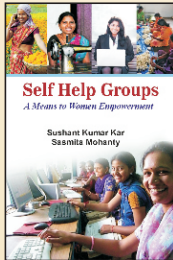
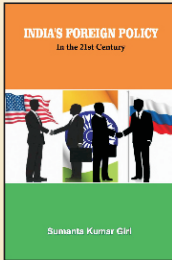
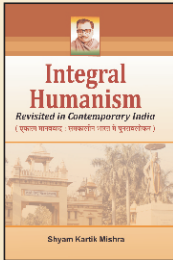
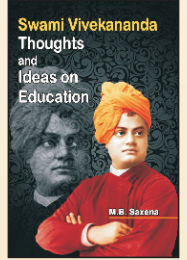
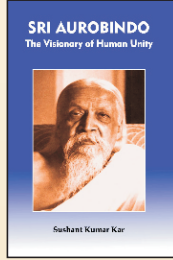
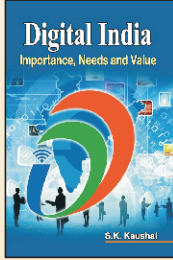
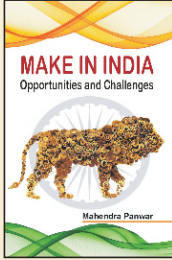
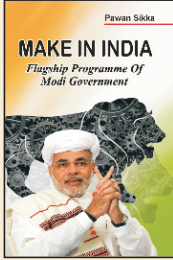
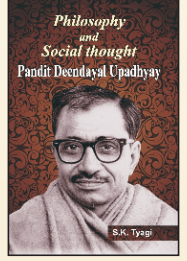
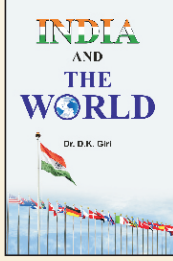
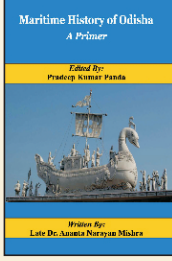
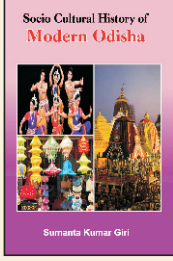
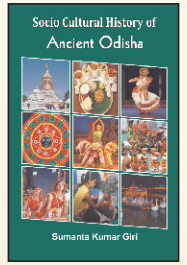
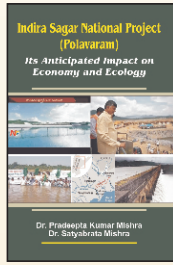
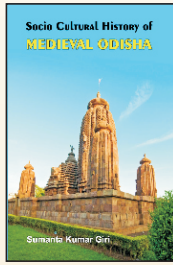
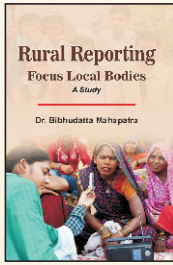
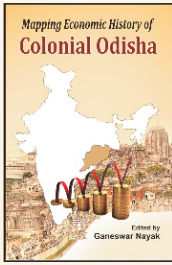
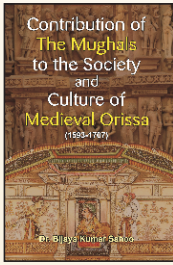
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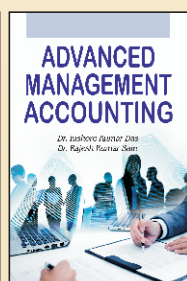
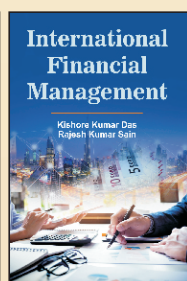
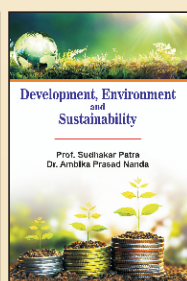
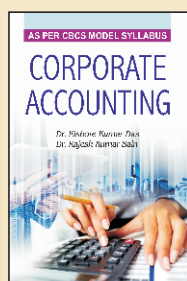
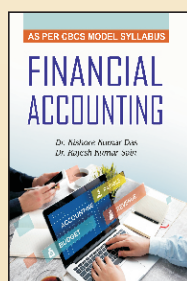
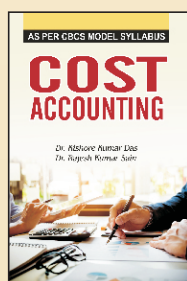
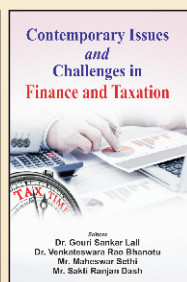
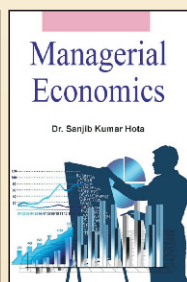
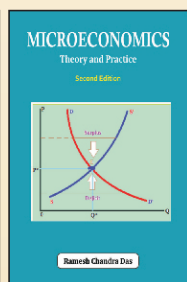
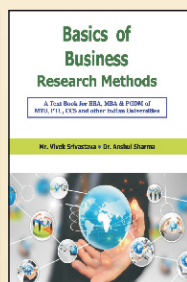
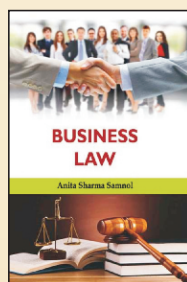
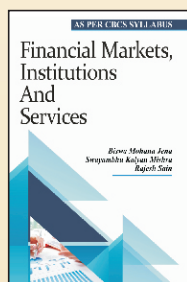
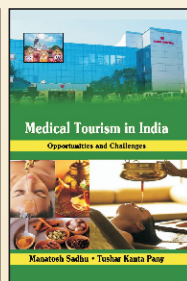
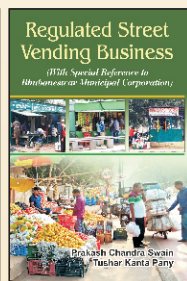
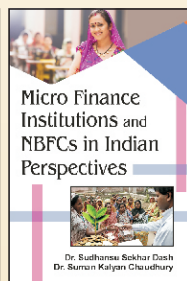
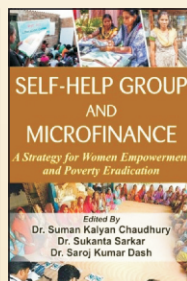
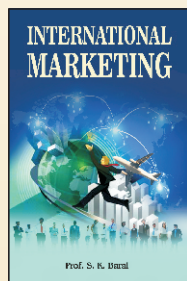
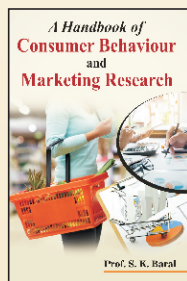
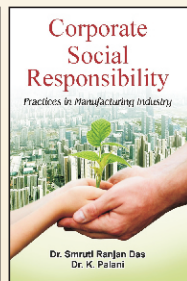
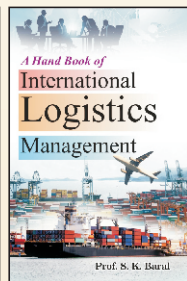
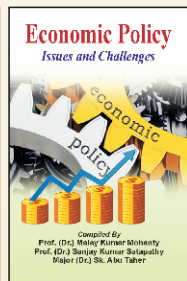
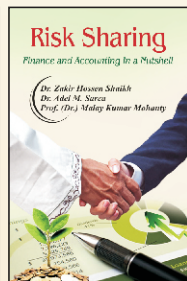
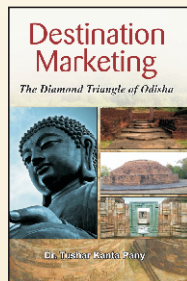
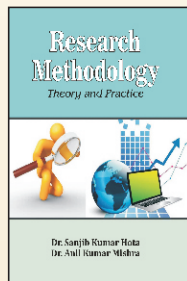
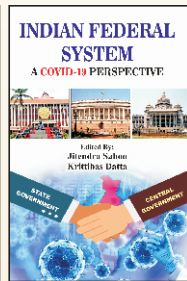
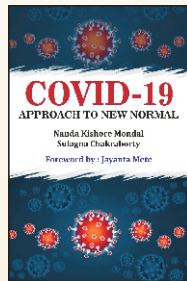
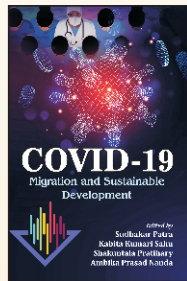
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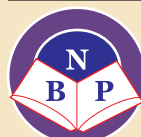
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